July-August 1954

Communications—Electronics—Photography

SIGNAL

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President of the United States

Arthur S. Flemming
Director, Office of Defense Mobilization

Val Peterson
Federal Civil Defense Administrator

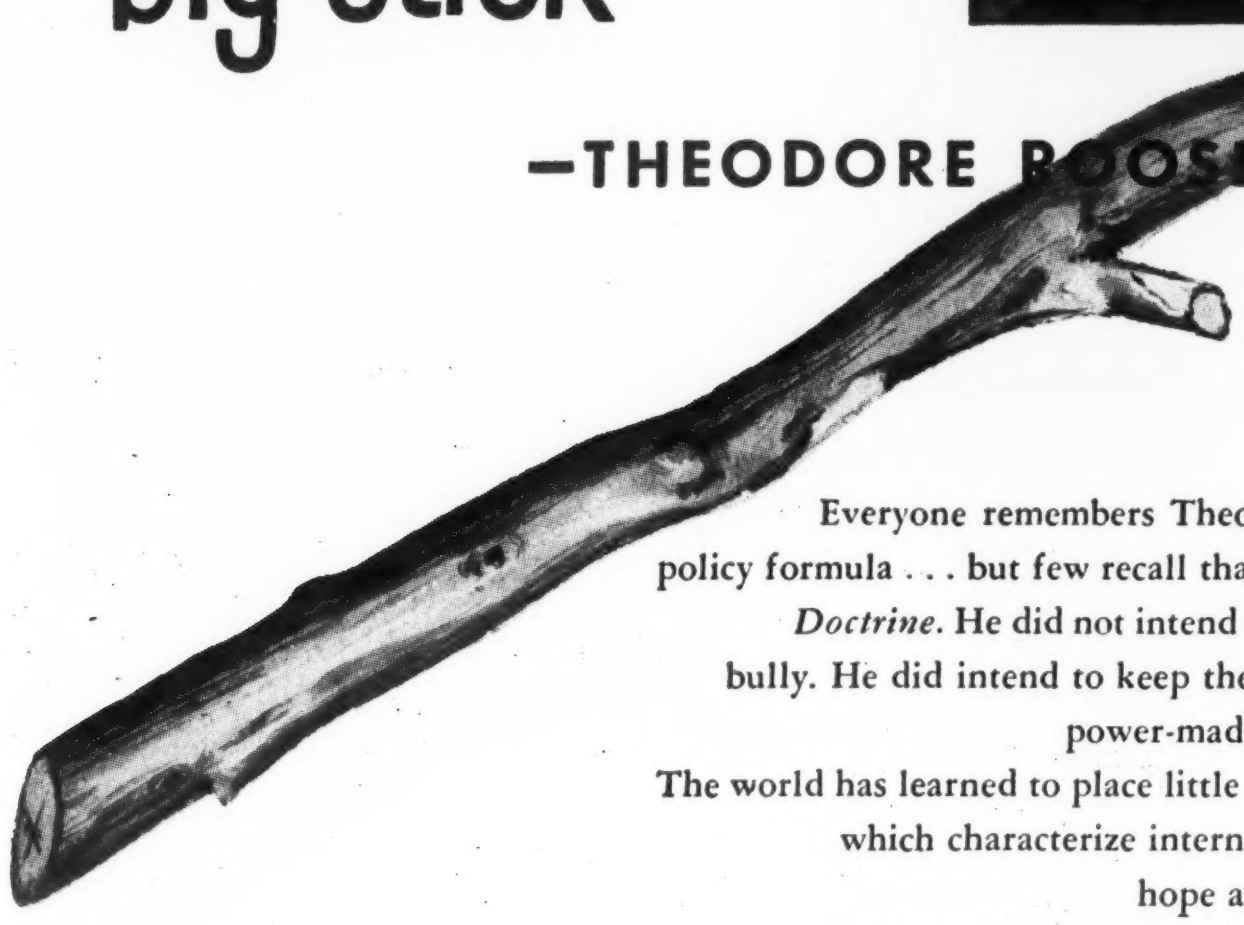
Maj. Gen. Frederic Harrison Smith, USAF
Deputy Commander, Air Defense Command

YOU share the defense burden with these leaders who reminded us of our responsibilities at the 8th Annual AFCA Convention.

Guide words for today

"Speak softly and carry a big stick"

—THEODORE ROOSEVELT



Everyone remembers Theodore Roosevelt's famous foreign policy formula . . . but few recall that he was referring to the *Monroe Doctrine*. He did not intend to make America an international bully. He did intend to keep the old-world tyrants, dictators and power-mad aggressors out of the Americas. The world has learned to place little confidence in the loud harangues which characterize international talk today. While we still hope and work to achieve lasting peace, it behooves all the free nations to heed Theodore Roosevelt's advice . . . to speak softly, and to build the defensive strength which will give meaning to their words.

W. B. Stewart

President

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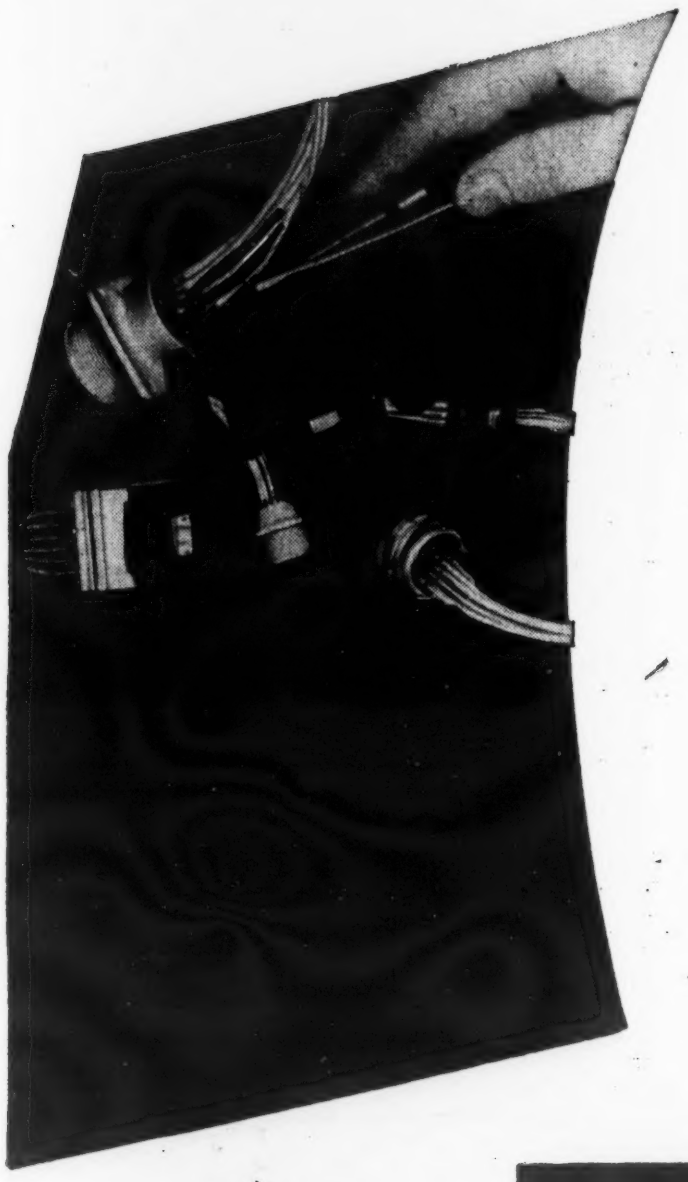

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24 parties on one line but nobody ever has to wait!

Suppose *you* owned a telephone company with service between two small towns ten miles apart. Suppose further that each town had a sudden growth in population so that the low-rate toll calls between the two grew and grew.

A knotty problem, that! Your subscribers would protest loudly if they found the line constantly busy. And you could go broke, quickly, if you started installing long lines of extra poles and wire to handle 15c and 25c calls.

Many small American telephone companies solve this problem neatly with Stromberg-Carlson "Carrier" equipment. In simple language, Carrier equipment is an ingenious electronic device which—on *one* pair of wires (going and coming)—impresses electrical currents of different frequencies. Subscribers who dial or ask the operator for the nearby town automatically get a frequency that's open for use—and as many as twenty-four (or more) can all talk at once over the same wire!

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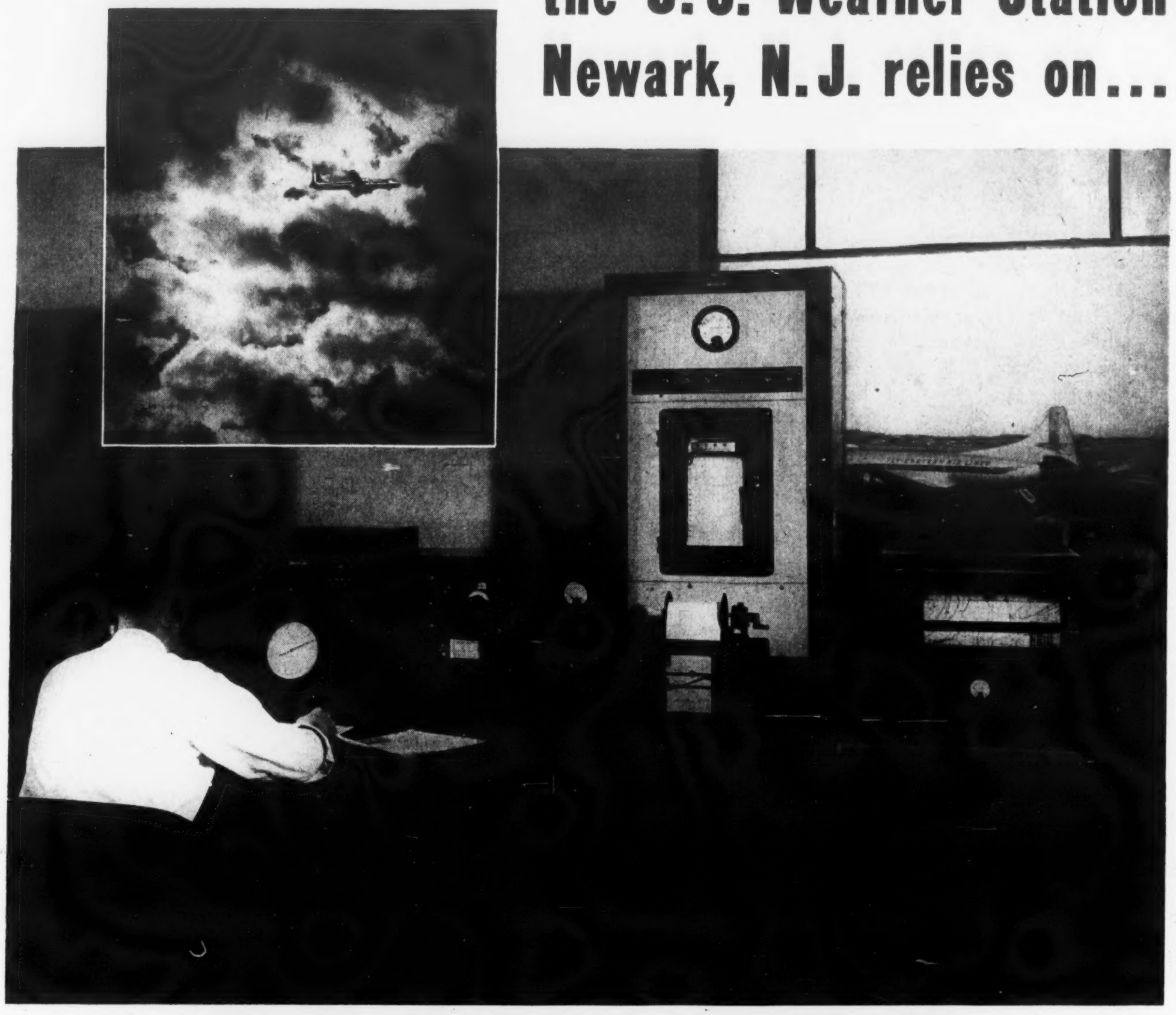

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Memo to SIGNAL Readers:

This is the time of year when one thinks of graduation—and all it means to the young person receiving the coveted diploma. To the young men and women just completing their college careers, it is the beginning of a new life. They step from the campus into the world with high hope and determination. And for each young American it means stepping out into a world full of confusion, but for him there is no limit to which he may aspire in our free country.

It is with this transition from college to career that AFCA is particularly concerned—it is our desire and intention to recognize outstanding worth and leadership among those graduates. The young men receiving the AFCA Gold Medal and Free Membership Awards are outstanding members of the senior classes at schools all over the country. They are the potential leaders in tomorrow's industry and the future generals and admirals in our armed forces. We are proud to welcome them into the AFCA, and the local chapters where these winners live welcome them especially.

This year the AFCA awards have been enthusiastically received by participating colleges and universities. We have had numerous letters from presidents, deans and ROTC instructors telling us how important the award has become and how much it adds to the annual presentation ceremonies and reviews.

During the past four years over 600 medal awards have been made by the Association. We believe the interest and enthusiasm in the AFCA is well worth the time and expense involved.

Good luck and great success to our new ROTC award winners in the class of '54!

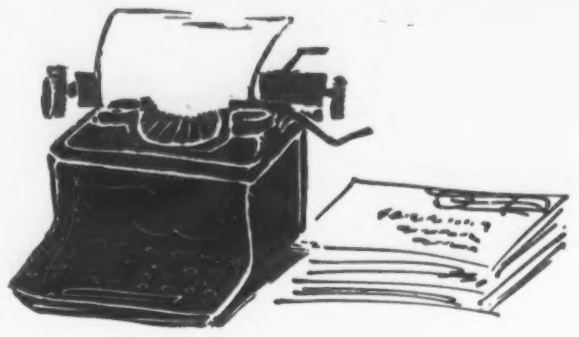
The Editor

(ROTC Awards Will Be Announced in the September-October issue)

Companies Accepted for AFCA Group Membership since May 1, 1954

Bell Telephone Laboratories, Inc., Whippany, New Jersey
Capehart-Farnsworth Co., Fort Wayne, Indiana
Hitemp Wires, Inc., Mineola, New York
Hopkins Engineering Co., Altadena, California
Jansky & Bailey, Inc., Washington, D. C.
RCA Photophone, Ltd., London, England
Sparton Radio-Television Division, Sparks-Withington Co., Jackson, Michigan
Texas Instruments, Inc., Dallas, Texas
United Transformer Co., New York, New York
Wilcox Electric Co., Inc., Kansas City, Missouri

505 new individual members from May 1 to July 1, 1954.



Our Readers Write

Convention Kudos

DEAR SIR:

I certainly did enjoy our annual conference . . . came away with a much clearer view of our problems and activities and strengthened confidence in the ability of our local chapters to render invaluable service in our highly complex and specialized field.

W. KELLY MOSLEY
President
AFCA Atlanta Chapter

DEAR SIR:

. . . Enjoyed seeing so many old friends whom I have not seen since the war and becoming acquainted with new people in my own field. Even though I am in the broadcast business, I still feel I am in the communications business.

LOYD C. SIGMON
Station KMPC
Los Angeles, Calif.

Canadian Comment

DEAR SIR:

Since my arrival here I have been placing my copy of SIGNAL throughout the Telecom branch. When the magazine returns it shows evidence of having been well read. All the telecom officers have indicated a strong interest in the magazine.

MAJ. PAUL A. STUART, USAF
RCAF Station
St. Hubert, Que.

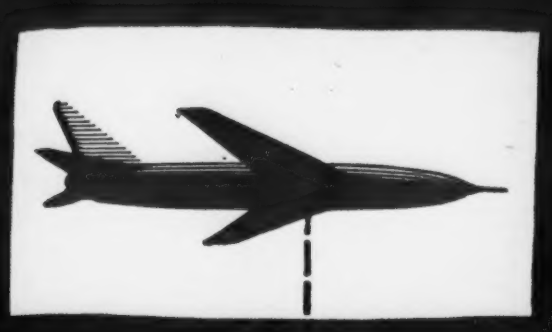
Foreign Readers

DEAR SIR:

We request permission for our school to publish in its magazine, "Communications Information for the Armed Forces," certain articles from your magazine.

This publication is distributed among the corps of officers and sub-officers of the communications service without profit.

COL. ROBERTO VON WERNICH
Director, Communications School
Campo de Mayo, Argentina



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AND INCREASE EFFICIENCY! Current proof is Crosley's new, miniaturized Glide Slope-Localizer Receiver for aircraft instrument landings. It's 40% lighter, 24% smaller, requires less power, provides easier installation and maintenance, improves reliability.

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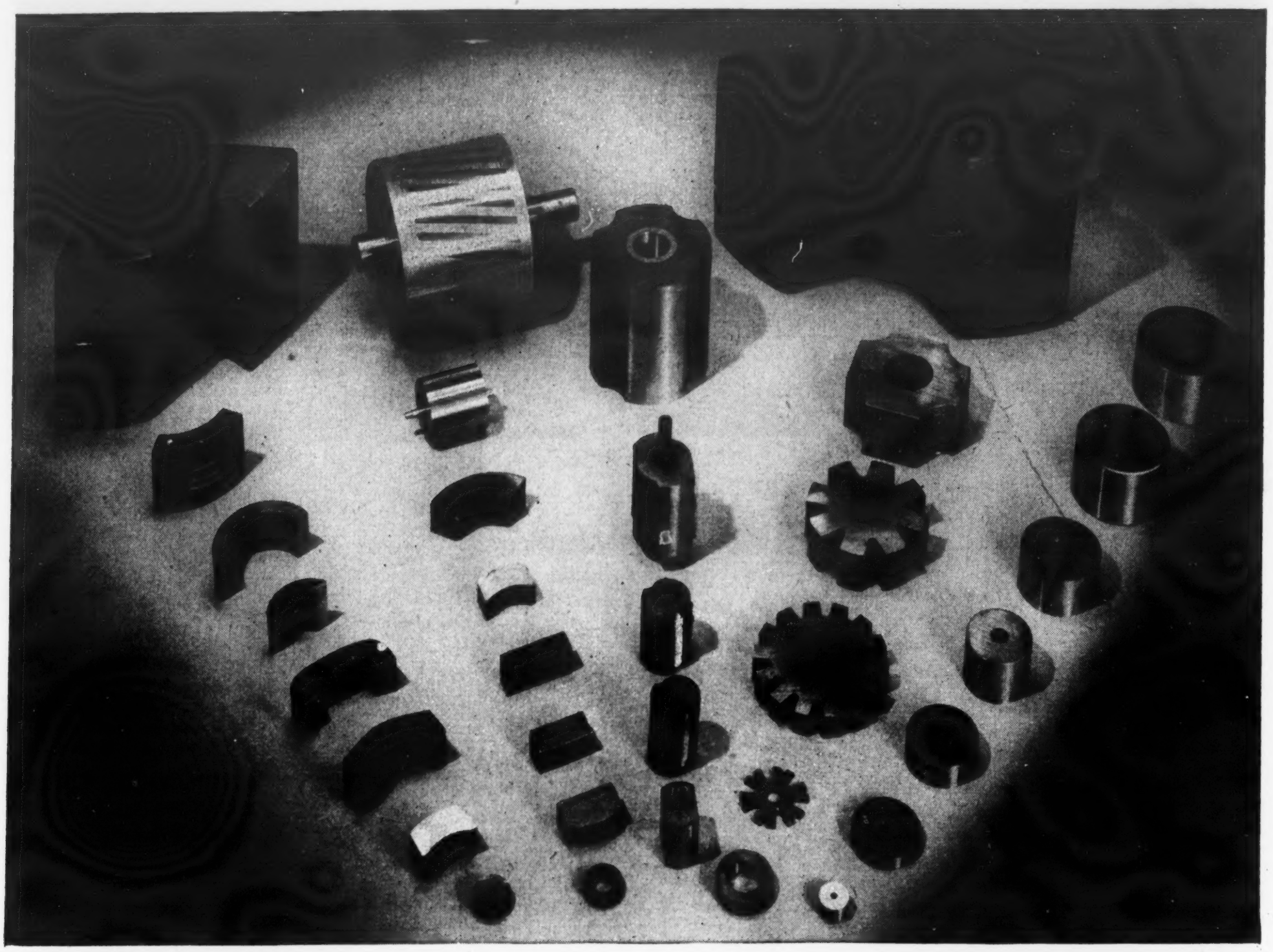
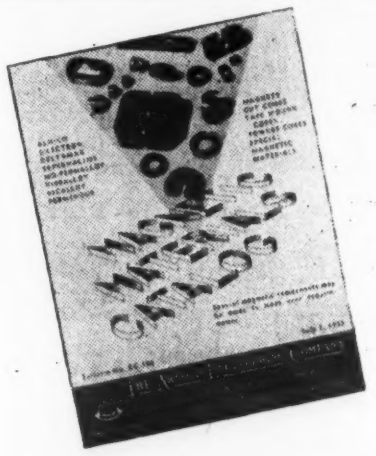


Magnets for rotors or stators ...any design or size you may require



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Write for your copy

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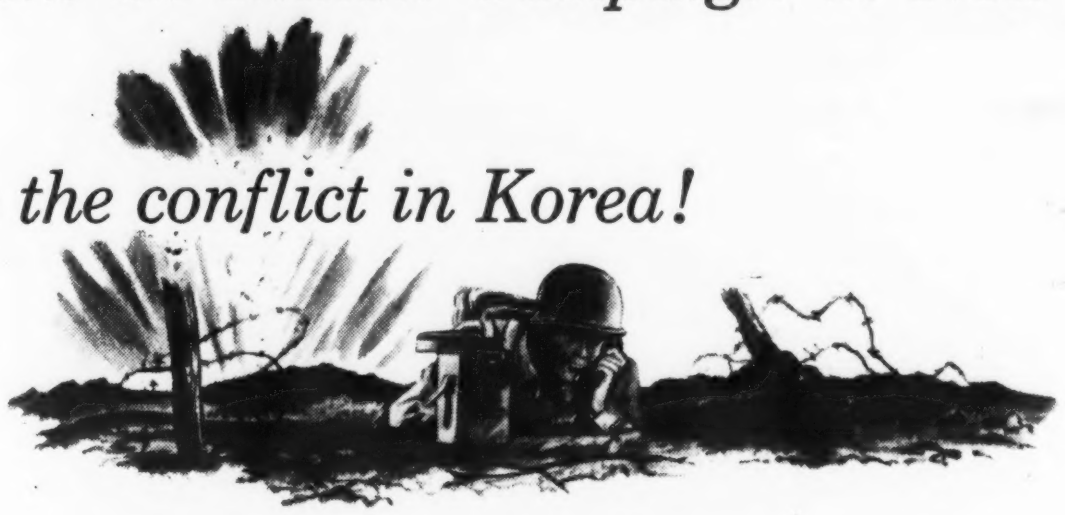
94th Anniversary
United States Army Signal Corps

They Taught the Army a New Way to Talk

. . . and kept its messages moving in peace and war from an Indian Campaign in New Mexico to the conflict in Korea!



It was June, 1860, 94 years ago this month, when the United States Army formed a new department—the first of its kind among the armies of the world. They called it the Signal Department and named newly-commissioned Major Albert James Myer to head it.

Major Myer won Army approval for the Signal Department by solving an age-old military problem. For he was the first to devise a fast and accurate system of sending military messages—faster than a mounted courier could ride—by wig-wagging flags and torches to form the letters of the alphabet.

Within a few short months, the Signal Department had fully proved itself. Signal Officers first used the new "wig-wag" method to signal messages during a campaign against hostile Indians. This was the successful beginning of the modern Signal Corps . . . now in its 94th year of service to the Army and the nation.

And since the day of flag and torch . . . through the Spanish-American War, World War I, World War II . . . to stringing wire under enemy fire on the hillsides of Korea, the men of the Signal Corps have never faltered in their mission. Serving front-line troops in every war, they have risked—and given—their lives to provide the Signal Communications needed by the Army. They have been peacetime pioneers, too . . . ever alert to new methods, new equipment, new ways to send the Signal through.

For these 94 years of valiant and devoted service, Kellogg joins the nation in grateful tribute to the men of the modern Signal Corps . . . and salutes the memory of those who helped forge its tradition of "getting the Signal job done."

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THE WHITE HOUSE
WASHINGTON

May 6, 1954

Dear Admiral Redman:

It is a significant and serious matter that today, long after the end of World War II, the keynote of the 8th Annual Convention of the Armed Forces Communications Association should still need to be so compelling a subject as "The Continental Defense of the United States."

In the brief span since your first convention, changes in the power and destructiveness of military weapons and in defensive measures against them have been epochal in meaning for the military, for diplomats and for private citizens alike. The best minds in America, in and out of government, have these problems under the most searching analysis. I am sure that the deliberations of your convention on the subject will be of real value to the nation.

I send you my warm greetings as you meet together, and I hope that you will have a most satisfactory and productive convention.

Sincerely,

Dwight D. Eisenhower

Rear Admiral Joseph R. Redman
President
Armed Forces Communications Association
1624 Eye Street, N. W.
Washington 6, D. C.

The Honorable Val Peterson
addressing the Keynote Luncheon
at the 8th Annual AFCA Convention

Federal Civil Defense Administrator

VAL PETERSON

keynotes the 8th Annual

AFCA Convention—

A Challenge for Defense

ONE DAY LAST SEPTEMBER, THE GERMANS IN THE GOVERNMENT at Bonn took me over to visit the little city of Darmstadt, where some of you may have been in World War II. There, I was taken by the Director of Civil Defense to what had been the Control Center for Civil Defense in Darmstadt during the war. The man who is now Civil Defense Director in Darmstadt held the same position during World War II. He showed me this little Control Center, made of reinforced concrete not very many feet under the surface of the earth. Then he told me the story of the historic English raid on Darmstadt.

The British waited until the wind was just right one evening, and raided Darmstadt with incendiary bombs, creating a tremendous fire storm, so intense, so violent and so sudden that in some cases the Germans were unable even to get their fire engines out of the fire houses. Thousands of people were burned to death in their homes. Why? Because civil defense authorities had told them that in event of an enemy raid they should go to their shelters in their basements and not leave.

As the bombs found their targets, communications leading into the Control Center were cut almost instantaneously. People sat in their homes, in their basement shelters, not knowing that a fire storm was developing in the city. The Civil Defense Director sat in solitary splendor in his Control Center cut off from the people, and the people cut off from him. He couldn't get in or out, no one could get to him. Meanwhile, thousands of people burned to death that night in Darmstadt.

At the time of the raid, Darmstadt was a city of 110,000; a very lovely little German city. Today it is not quite back to 100,000. I mention that only because of the vital importance of adequate and reliable communications to all of us in civil defense, or in the military, or anywhere else in a position of responsibility in time of an emergency. That night, there might just as well not have been a Civil Defense Director in Darmstadt. As a matter of fact, he had nothing the minute the communications went out. And that is exactly what we will have in the United States if and when an atomic raid takes place on this country and our communications are knocked out, if they are knocked out.

It is not my purpose this noon to talk about communications, because we are going to have a symposium devoted in large measure to that this afternoon, and I want to make some comments about it at that time. Having started to talk about Darmstadt, though, I should like to tell you one or two other things about it. As a result of that experience, the Germans are now in the process of rebuilding Darmstadt. I believe it is the finest example of modern planning for the Atomic Age to be found anywhere in the world—and I am familiar with what the Germans are doing in West Berlin. As a result of the terrific fire that consumed Darmstadt that night, the Germans are building what they call fire alleys. A fire alley is nothing but a great, wide street, not all of which is paved, of course. Enough of it is paved to handle traffic in and out of that city. These fire alleys run from the outskirts directly to the heart of the city and from two or three or more directions. These roads are so wide that they never can be blocked, no matter what kind of a catastrophe befalls the City of Darmstadt. They are so wide that no matter what happens, it will always be possible to drive trucks and other vehicles right into the center of the city and right back out. The Germans are not going to get trapped in their own city again.

In addition, the Germans require any property owner who builds along those fire alleys to erect his building so far back from the edge of his property that if it collapses, it falls on his own property and not on the public street. And that makes real sense in the Atomic Age. If its people are going to be alive after the air raid warning is sounded, every city from now on will have to have streets constructed on those lines, with buildings back far enough from the public street so they cannot block the streets when they collapse.

Destruction Capability Must Guide Plans

I was in Waco, Texas, at the time of the tornado there last summer. Of the buildings which collapsed, only one was of any size. It was an old, five-story brick building. It piled debris in the street up to a height of 20 to 25 feet. Even the collapsed two-story buildings piled up debris high enough to cover automobiles. All of this means that if we are serious about survival in the age in which we now live and from which we can never escape, then we must start to plan our cities in terms of the requirements of this age.

Obviously, I am not suggesting that we tear down all our cities. That would, of course, be silly. But we must reconstruct our cities as the opportunities afford themselves, in keeping with ideas of this kind.

Now, what is civil defense? That is a problem that seems to concern some people from time to time. As I see civil defense, it is simply the expansion of already existing community civic services to meet an unprecedented problem. If we have an atomic attack upon the United States, one of the first things that we will have to do—and we will need to do it desperately—is to maintain law and order. So we need in every one of our great cities hundreds or thousands of trained auxiliary policemen to help maintain law and order, whether we are evacuating or whether we are cleaning up after the attack. We will need not only all the National Guardsmen we can muster but we will need all these policemen, and we will need trained auxiliary firemen, hundreds or thousands of them, because what is left standing in our cities is likely to be on fire. We will want to salvage everything we can, so we can get on and win the war, which will be our objective. We will need trained communications workers, all of them we can possibly get, in every field of communications. We will need trained transportation people, organized people who have planned and who have disciplined themselves in advance. We will need people trained in mass feeding and in mass sheltering of people. We need block wardens. We will need trained rescue workers,

Mr. William McGee (l) of the Executone Company, New York and Mr. Bud Densberger of the Navy Department, Washington, try out a Combat Information Center Communication Console IC/JBA-IR, one of the many pieces of equipment which were displayed at the Shoreham Hotel during the Convention.

Mr. W. S. Karr (l) of Lansing, Michigan watches Mr. J. R. Jermak of Wright-Patterson Air Force Base demonstrate a Triad Model 200 16mm movie camera that shoots at 200 frames per second. This was part of the Air Force photography exhibit at the Convention.

because if you go out to rescue people without training, you may kill them, rather than save their lives. It requires tools and equipment.

Now, everything that I have mentioned so far, is at the command of the Mayor in every city in America. Every Governor has similar organizations, and personnel at his command and the President of the United States has it at his command. There is nothing new about this, nothing mysterious about it. These are not new concepts, with the exception, I think, of the block warden, which we borrowed from the British experience in the last war, and the idea of mobile support teams which can go from one part of the country to another part to extend help.

Now, civil defense has no military responsibilities, of course. It is the responsibility of the military to attempt to prevent these bombs from falling upon the United States—and that is a real responsibility. The military is fully conscious of it and, in my judgment, is doing everything humanly possible to meet that responsibility intelligently, promptly and as adequately as circumstances will permit. But I know of no responsible person in the military who feels that, should the Russians direct an attack toward the United States, that attack will not meet with a considerable measure of success. How much success will depend upon the day, the number of airplanes thrown against us, the type of airplanes, the number of bombs they carry, and the size of the bombs. Those are all things that will shift from day to day and month to month.

All we know is that as the President said before the United Nations on December 8, Russia does have the capability to make an attack today, and that capability will increase with the passage of time. And those of you who read about their unveilings of aircraft at the May Day parade recognize that they have skillful technicians, as we have skillful technicians, and what we can make, they can make. Any time we assume that the Russians can't do what we can do, we are making the most elemental mistake possible. No man who has had any experience in the military would make such a mistake and certainly no man who ever coached a football team would. You just don't underestimate your adversary unless you want to live to rue the day. So the attack may come, and when it does, it is likely to meet with considerable success.

It is not my job to prophesy today whether there is going to be a war—you make your own prophecy. All I can say to you is that if there are people in the world who have the

capability to launch a successful attack upon our country, and if we know as much as we do about the motives and the actions of those people, then prudence would require that we be prepared as fully as possible to protect ourselves.

Now, I don't know that I need to get back into the business of how many of those bombers will get through other than to say I have never heard anyone successfully contradict the comment that was made by the former Chief of Staff of the Air Force, Gen. Vandenberg, when he said a couple of years ago—and I appreciate that is two years ago—that probably seven out of every ten bombers thrown against the United States would get through. I don't care whether it is down to six. I hope it is down to six or down to five. The lower it gets, the better. But it is still a mathematical proposition. The enemy knows that as well as we do. Then it is simply a problem for him to throw enough bombers and enough bombs against us so he can absorb the losses and still gain his objective; and he knows that business as well as we know it. And we know that we can make a successful attack on them, thank God, if necessary. Prudence again requires that we recognize what we can do, he probably can do just about as well—we hope not quite as well.

Civil Defense Aims for Survival

That is not the job of civil defense. Obviously, however, we must know what are the common facts in this field in order that we know the necessity for our work. Now, our job is not to stop the bombs from falling. Our job is to minimize the effects of the attack after it takes place. That is a man-sized job, too, just as stopping those bombers from getting in here is a man-sized job. As a matter of fact, I don't envy Gen. Chidlaw or Gen. Smith their assignments at all. I am rather glad that such experience as I have had in the Air Force was pretty much on the other side of the equation with Gen. LeMay. It seems to me that is the more interesting phase of this business at the moment; at least, it is a fair statement to say that air offensive is ahead of air defensive presently.

Now, along about March, 1953, I was invited over to the White House with the Cabinet members and members of the Security Council and the Joint Chiefs of Staff and others, and I saw for the first time, as did most of the people in that audience, the motion picture, "Operation Ivy," which has now been made public in this country and all over the world. This is the film record of the first hydrogen explosion in the history of the world which took place in November, 1952.

Until then, my agency had been planning for an atomic attack in terms of what we called 2½-X bombs—X meaning the bomb that fell over Nagasaki and Hiroshima, which was a bomb the equivalent of 20,000 tons of TNT in explosive force. We were planning in terms of bombs of 50,000 tons of explosive force. Those are not exactly firecrackers, but they are pretty small in terms of today.

I went away from the viewing of that picture, of course, with the understanding that we simply must not continue to plan in terms of bombs of that size. We had had observers at Eniwetok for Operation Ivy and I saw the film some three months later. Seeing something is a little different from hearing about it.

And so, starting about June of last year, in talks all over the United States, I began to say to Americans, "If an atomic attack is made upon your town, there is only one way that you can be sure that you will be alive after the bomb goes off, and that is not to be in your town. There are only two ways I know that you can avoid being in your town: One is to go deep down into the bowels of the earth, so far down that the bomb can't get to you. That is down quite a ways, but it is perfectly feasible and possible and sensible from a protection standpoint. The other way is to get out of the town on the surface of the earth, because when the bomb goes off, your city will be gutted. I doubt it will be destroyed completely, but it will be gutted, and if you are there, and you are unfortunate enough to be anywhere near the center of the bomb burst, you will be vaporized or at least killed in one way or another.

Now, what about going under the ground? Well, last September I went to Norway and Sweden to see what those Scandinavians were doing about going under the ground, because they, with the Swiss, lead the world in the movement underground today.

Underground One Solution

It happens that Norway and Sweden are located on huge beds of granite. In a great city like Stockholm, a city of 800,000, the Swedes, have made an opening into one of those great granite beds about 50 feet under the surface. They have hollowed out a tremendous cavern on two levels which will accomodate 20,000 people. This cavern, at the center of the town, has elaborate air conditioning equipment as well as sanitary and communications facilities. It also has gas filters, because, the Swedes told me, they believe it likely that in the event of war, the Russians would use gas instead of bombs. From an enemy standpoint, that makes good sense. At least, the

Colonel George P. Dixon, executive vice president of the AFCA, addresses the Chapter Presidents' meeting which took place during the Convention. To Colonel Dixon's left are: Admiral Joseph R. Redman, retiring president of the Association; Frank Wozencraft, general counsel of the AFCA; Mrs. Julia B. Godfrey, chapters secretary at national AFCA headquarters; J. R. Hafstrom, president, Cayuga Chapter; Col. Gomer Lewis, president, Scott-St. Louis Chapter; Raymond B. Meader, president, Boston Chapter, and Adm. T. F. Halloran, AFCA national director. To Colonel Dixon's immediate right is George W. Bailey, new AFCA national president.

Taking special interest in a demonstration of some of the Signal Corps teletype equipment which was displayed at the Convention are Mr. and Mrs. Charles R. Rowe of Philadelphia. Mr. Rowe is with the Oak Manufacturing Company.

Swedes thought so—because then an enemy could kill the people and take over intact the manufacturing plants and the wealth of the community.

In Gothenburg, Sweden, I saw a shelter 120 feet under the surface of the granite. In the center of Oslo, Norway, there is one that will take 6,000 people. It is about 40 feet under the surface of the granite. I saw part of the AGA plant under the surface. The great Bofors Factory is spread out over 25 miles on top of the earth and part of it is under the ground in granite. I saw a municipal water supply system, a telephone system and power plants —all under the granite. I was told about places where destroyers can slip under the rock so they couldn't be bombed from above. And I was told of one airstrip where jet fighters could be run into the caverns and then wheeled out to a runway for flight.

Now, one thing that I particularly noticed over there is that—so far the Swedes and Norwegians are able to create a cubic foot of space in the rock for just a little more than it costs to create a cubic foot of space in a building like this. If you amortize the capital costs and the maintenance costs—the maintenance costs obviously are less when you are under the ground than when you are on top of it—over a period of 25 to 30 to 50 years, it is actually cheaper to have your installation underground than on top. And the workers seem to like it better under the ground than they do on top. In the Bofors factory, I was told that the air conditioning systems are so good that it is actually more comfortable down there, than it is on top of the ground.

In the Bofors factory, they have worked out a panel divided into four parts to represent four weather conditions up on top of the earth so that Poppa could see how Momma and the kids were living up on top, whether the sun was shining, whether it was raining, hailing, sleeting, or whatever, and he would know whether to put on his rubbers when he went out of the cave at night to go home.

Now, I am not proposing that we go underground in the United States. It is feasible from a protective standpoint, entirely feasible. As a matter of fact, we have enough rock in some parts of the United States that we could all go under if we wanted to go to those parts or those parts wanted us to come. However, most of our cities are located in places where, if we were to go under the ground, we would have to go to depths of 50 to 75 or 80 feet. There we would have to build vast concrete catacombs, steel-reinforced, and with all of the equipment that I described in these Swedish and Danish places. It would take billions of dollars for the American people to go under the ground—untold billions of dollars. And I don't know how long it would take to build those catacombs. So we have not proposed that as a solution to our problem. Rather, we have proposed getting out on top of the ground.

Now, getting out on top of the ground is pretty tough, too. First, it requires that we have warning of an impending enemy attack in time to permit us to get out of the town. Now, I drive downtown to work in the morning and I drive home at night just as you do, and I know that our traffic problems are darned near impossible some days, just in peacetime living. I am not trying to minimize this problem at all. But what are the alternatives? The alternatives are either to stay in the cities until the bombs go off and die—which isn't a very happy alternative—to dig into the ground, or to get out on the surface of the ground.

Warning—then, Walk

Now, in spite of the difficulty of the traffic problems involved, I am convinced that we have enough ingenuity and imagination and ability in our American cities that if we will sit down and face this problem squarely, we can figure out ways to evacuate every American city, including New York—and that is the toughest problem of any place in the world. Some of them will not be so tough. But first we have to have warning time. Now, giving the American people warning time is the responsibility of the military. It is a responsibility that the military should not take lightly, and it does not take lightly. And it is particularly the responsibility of the Air Force—and even more specifically, that of Gen. Smith, who sits here with us today, and Gen. Chidlaw, and I know how concerned they are about it and that they are doing everything that is humanly possible to be done.

Now, if we are going to have adequate warning, it appears that we must have a warning net as far north as we can get it, extending across the wastelands of Alaska and Canada, with arms sticking out to sea in both directions. We also need a detection system composed of radar and listening devices of other types that you people know much more about than I do, extending, perhaps from Hawaii up through Alaska and Canada, over to Iceland and Greenland, and down to the Azores. That is a mighty big order.

Now, you know the deficiencies of today's radar better than anyone else. You know the job it is to make those installations up in that northern country. But that is the job Uncle Sam now has under way.

It is hoped that in a year and a half or two years, depending on how fortunate we are, the time will come

Mr. Jack Nanlin (right) of the Olney, Maryland Civil Defense unit points out the various lifesaving devices on a Civil Defense truck to PFC Joel Meidrantz of Walter Reed Hospital, Washington.

Mrs. Joseph R. Redman, chairman of the Convention Ladies Program, stands after being introduced at the Keynote Luncheon. Also at the headtable are (l to r): Col. George P. Dixon, AFCA executive vice president; Dr. Lloyd V. Berkner, president, Associated Universities, Inc.; Maj. Gen. Harry C. Ingles, retired Chief Signal Officer and member of the RCA Board of Directors; H. V. Higley, Administrator of Veterans Affairs; Mrs. Redman; W. Walter Watts, RCA executive vice president; Frank Wozencraft, AFCA general counsel, and Haraden Pratt, former telecommunications advisor to the White House.

when we can have somewhere between two and six hours of warning time for every American city. If we can get from two hours of warning time on up—and six hours won't be too much—we can save millions of American lives should these Russian communists direct their airplanes toward us.

It would be my guess—and it is only going to be a guess until the day that we actually run the test exercises—that nobody can blueprint this thing or slide rule it. We are going to have to run the test, and we are going to have to do it whether our wives, children, and the cash register like it or not. We are going to have to stage dry runs on emptying American cities, if we are serious about saving the lives of the people in these cities.

Now, my guess is that if we can get two hours of warning time, we can evacuate cities like Columbus, Ohio, or Indianapolis, Indiana, with half a million, or Milwaukee, Wisconsin, with about 800,000. We can evacuate those cities, I believe, in two hours or less with very careful, skillful planning and training exercises.

Now, what do we do when we get to Seattle, San Francisco, Los Angeles, New York, New Orleans, or Chicago? Chicago is not as bad as some of the others because it is not divided up by water as New Orleans, San Francisco, Seattle, and New York are. We need more time than two hours. But maybe we are not going to get everybody out.

City Officials Must Plan for Evacuation

How do you start evacuating a city? I am not a traffic engineer, but I have been forced by questions to start thinking a little bit. How do you go about to evacuate a city? You don't start at the center of the city hall; you start evacuating from the outside. And the people who live at the edges of the city, if they only get fifteen minutes warning, may get far enough away to save their lives from a hydrogen or an atomic explosion or maybe a combination of them. Every time you have fifteen minutes or thirty minutes or an hour or two hours or three hours, you can start moving people from the outside on out. And every time you can shift those people a couple of miles from the downtown section, from the target area, the assumed target area, you begin to save lives.

Now, if we are going to wait and do this the first time that the Russians come, we might just as well not plan on doing it. When you hear the sirens go off and that means they are coming, you might just as well sit down and start playing penny ante poker or holding hands, because it is too late then to do anything about it. Now is the time we have to do something about this, right now.

Several cities already are planning in this area; they have been for months. Gen. Maraist, the civil defense director there, tells me that he can get the people out of New Orleans, and he is working on his plans. Milwaukee has been working on these plans. The Mayor of Milwaukee, Mayor Zeidler, is in town today. His people are working on it. We are going to join with them and try to make a master plan out of that city of 800,000. Many other cities are working, too.

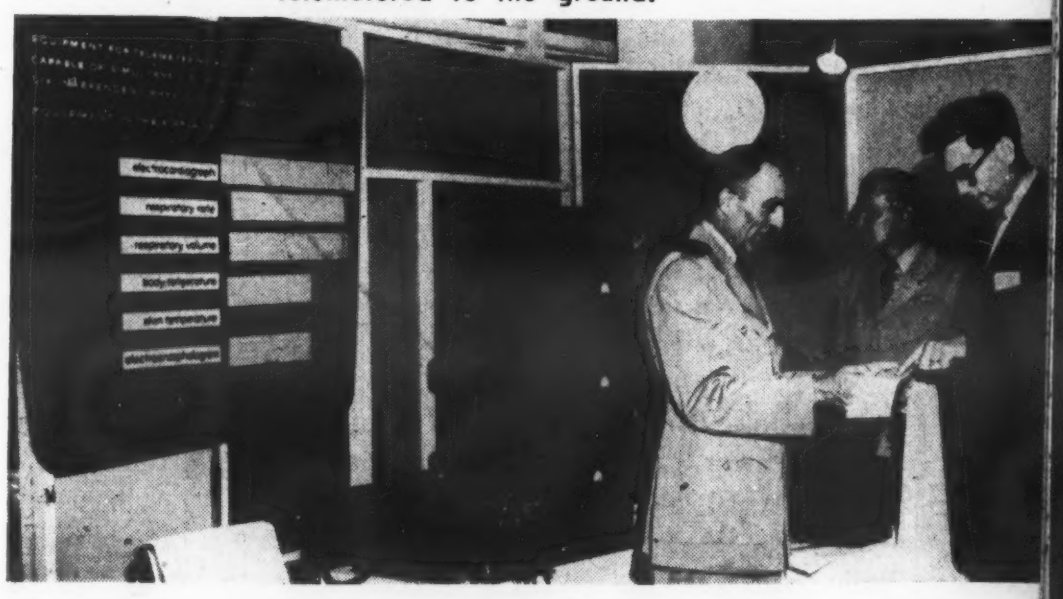
One police chief in a city out on the West Coast, when he read about this, said, "Well, now, there is a fine example of half-baked high level Washington thinking." He said, "It is impossible to get the people out of this city." I was quite amused by that comment—and somewhat pained too, because I recalled having made remarks somewhat similar in context about the thinking in Washington in the past few years. I didn't realize that we would get those things back in quite such an uncharitable fashion as soon after the change that has taken place in some respects down here.

I personally think we can get people out of our cities. I have to believe that. It is the only hope I see. The cities will be gutted. We must get these people out. I think we can. We have never attempted to do this. It has never been necessary before.

Now, out in Spokane, Washington, the other day it was tried on a very limited basis. Officials called it Operation Walk-out. They walked everybody from the downtown section of Spokane to what they called the loading perimeter. There the people were to be put into automobiles and moved on out by car. It was done in half the time that had been estimated. Some 15,000 people walked out, and in the rain, in an orderly, cheerful manner.

Now, that is a relatively small city, only 175,000. But that's exactly what we are going to have to do here in

Among the Navy's many exhibits was this display of a telemeter system for checking physiological conduct of pilots while flying. Here, Commander Norman Lee Barr, USN, of the Naval Medical Research Institute, Bethesda, Maryland, demonstrates to Ivan R. Saddler of Washington the recorded tape from a study of an airman's respiration, temperature, heart beat while in flight as telemetered to the ground.



One of the high spots of the Signal Corps' exhibits was this special 100" telephoto infra-red film camera which has recently been announced. With this 100" lens, the camera can detect a jeep six miles away. Demonstrating the camera is Sgt. Lloyd Carter of the Signal Corps.

Washington, D. C., and in Chicago and New York and all the rest of them, after the best traffic brains in these cities have figured out the way to get us out. This problem, in the final analysis, must be resolved at the local level. I don't have much confidence in brain-trusters sitting in Washington and figuring out how to evacuate Los Angeles. I would have a lot more confidence if the people of Los Angeles themselves figured out how they are going to get out of Los Angeles. I don't think election to office or appointment to office and removal to Washington makes you any brighter than you were the day before you got here, whether by accident of election or by appointment.

Now, here is a real challenge to the American people. Here is the first time that I know of that civil defense has said something constructive to the American people. We are saying now, "You cooperate in this venture; we will save your lives. We can't save your property, but we can save your lives."

I would like to have it recognized that I didn't invent the hydrogen bomb. I didn't have anything to do with making these things. I am simply trying to mop up afterwards. You get the impression sometimes that civil defense people or Air Defense people are responsible for these bombs.

Cooperation Necessary for Subsistence

Now, after we once get our people out of these cities we still have tremendous problems. How are you going to feed and shelter them? What distance must they be moved to make them safe? I would judge that as of today that would be about 25 or 30 miles. I am assuming that you don't accept some of the exaggerated statements in the press about what happens when one of these devices goes off. It doesn't destroy everything within an area of 400 square miles and all that sort of thing. Thank God, the law of diminishing returns applies here as it does in many other things in life.

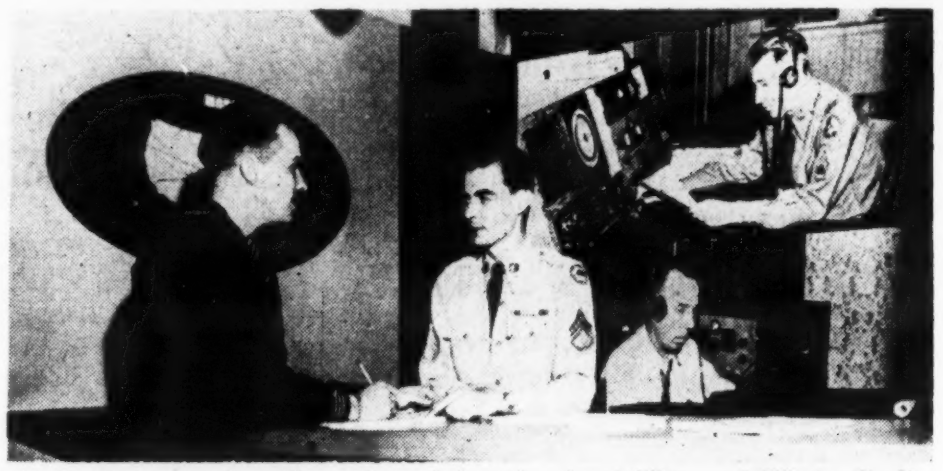
We must plan to get these people out in the country to a distance that would be safe, and there we would feed them and shelter them in schoolhouses and churches which had been agreed upon in advance so the people would know exactly where they are going to go. Every last man in town must know where he is going generally. Now, I realize you are going to get caught traveling around, and in that case you are going where the people in that area go. It is not too hard a problem to figure out.

Let me illustrate that. I was in one town one day, and I was asked, "What are we going to do about the school kids?" Well, here is what I think you are going to do about the school kids. Momma isn't going to come and get Johnnie and take him by the hand. We haven't got time for that monkey business. The General can't give us that much warning time. If you have school buses. or whatever you have, it must be agreed upon in advance that the kids in the schoolhouse located in the northwest segment of the town will proceed out northwest, assuming that the water doesn't cut them off, to an agreed-upon point, and Momma must know that Willie and Susie are going out there to be taken to that town or that schoolhouse or church I talked about a moment ago. And when this warning comes, out go the kids and the teachers. They do it now; they don't stand around to debate.

Now, let's say Momma and Poppa work over in the southwest segment of town. Where do they go? They go out to the southwest to an agreed-upon point.

Now, when does the family get together? It gets together the next morning if the family is alive. We are talking about stark survival now. We are not talking about going to a picnic. We are talking about whether we are going to be alive the next morning or the next hour. And we have got to get out of these target areas.

Fortunately, some people are helping us in this business. The other day, a farmer came into my office from Weld County, Colorado, the principal city of which is Greeley. He said, "Governor, I have an idea about how to handle these evacuees from Denver, Colorado," a city of 500,000 plus. He said, "I already have an agreement with the farmers and the farmers' wives whereby Weld County will take into their farmhouses, and for ten days, shelter and feed 200,000 people out of Denver. It is all agreed



At its large and well equipped booth, the Military Affiliate Radio System accepted messages for transmitting to servicemen in all parts of the world. Shown writing a message is Carl Richardson, TD3, USN, and on the receiving side of the counter is Sgt. Thomas Mears.

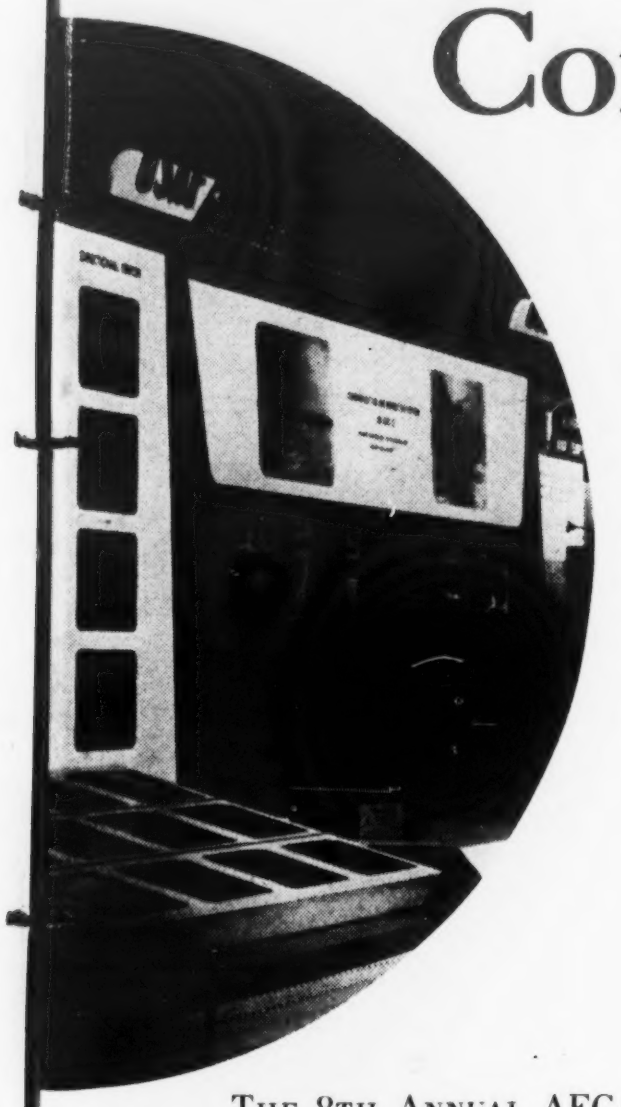
upon, already." I looked at him with astonishment and I said, "Who is going to pay for this for ten days." He said, "We will pay for it. We will feed them for ten days." I said, "Well, I thought maybe we would have to keep these people only about three days and then we could start figuring this thing out some other way." He said, "We will keep them ten days."

Now, this is a third of the population of metropolitan Denver that this one man has arranged to take care of along with his farm neighbors in one county in Colorado. I don't know whether that is indicative of what farmers will do all over America, but it is true that the farmers and their wives are inclined to be very hospitable people and it is not foreign to them to cook for large numbers of people and to bed down large numbers of people.

(*Continued on page 77, col. 1*)

Standing in front of the Signal Corps Pictorial Service television and movie display in the exhibit section of the Shoreham Hotel are: (l to r) Mrs. Paul L. Neal; Colonel Leland Stanford; Brig. General Paul L. Neal, Signal Officer, Army Field Forces, Fort Monroe, Va., and Mr. A. D. Swanson of the Illinois Bell Telephone Company.

Convention Highlights



The Air Force exhibit of light weight communications navigation systems.

THE 8TH ANNUAL AFCA CONVENTION unquestonably earned the title of "best yet." With headquarters in the nation's capital, the meeting drew over 850 people, by far the largest attendance in AFCA history, and the program continues to receive enthusiastic applause in letters still arriving at headquarters.

The theme, "Communications and Electronics in Continental Defense," guided the thoughts and activities of the members during the two-day meeting. At the Keynote Luncheon on May 6th, the Honorable Val Peterson, Administrator of the Federal Civil Defense Agency, set the pace for the Symposium which followed the luncheon. (See Mr. Peterson's talk on page 11.) Speaking at the Symposium with Mr. Peterson were: the Honorable Arthur S. Flemming, Director, Office of Defense Mobilization; Maj. Gen. Frederic Harrison Smith, USAF, Deputy Commander, Air Defense Command, and Frederick R. Lack, Western Electric vice president.

(Editor's Note: Due to space limitations in this issue, it was impossible to fully report the Symposium talks. These will appear in the September-October issue.)

During the tour of the Naval Ordnance Laboratory at White Oak, Maryland on May 7th, AFCA members saw demonstrations of latest military equipments, including the Nike and advanced anti-aircraft weapons, and the latest laboratory techniques for the development of these vital defense materials.

The elaborate exhibits at the Shoreham Hotel, convention headquarters, displayed up-to-the-minute developments in communications, electronics and photography and graphically illustrated the defense theme. All of the Services and the FCDA were represented with large and small demonstrations of all phases of our field. Some of the exhibits were: the "Dick Tracy" radio, Project Tinkertoy, a working combat communications console, tactical television hookup, and aero-medical electronic uses.

The main feature of the 8th Annual Banquet, which boasted the record crowd of 700, was the address by Hal S. Dumas, executive vice president, American Telephone and Telegraph Co. (see page 18), J. Harry LaBrum officiated as toastmaster. At this affair, Admiral Joseph R. Redman, retiring president of the Association, and George W. Bailey, new president, briefly addressed the group.

Industry-sponsored cocktail parties which preceded the Buffet Supper on the 6th and the Banquet on the 7th brought together AFCAers from all over the country for pleasant social interludes.

The outstanding Ladies Program, chairmanned by Mrs. Joseph R. Redman, undoubtedly set a precedent for future conventions, as it was the first time that a complete program was planned for the ladies during the entire time of the convention.

Convention Chairman Percy G. Black and his hard working committee presented a memorable program, productive and beneficial for all who attended.

Displayed for the first time at the AFCA Convention was the only instructional television system developed specifically for training purposes by the Navy. The simplified equipment, designed especially for use by ordinary classroom and laboratory instructors, is the result of five years of research in educational television at the Special Devices Center, Office of Naval Research. Demonstrating the portable TV system are: (l to r) Chief D. D. Drewer: TDI F. L. Richson; Capt. H. Sosnoski, Commanding Officer and Director of the Special Devices Center, Port Washington, N. Y.; Cdr. E. W. Hirber, Head of the Engineering Research and Development Dept., and H. J. Browne, Head Engineer, Service Division.

Communications in Defense

AFCA Convention
Banquet Address

by Hal S. Dumas
Executive Vice President
American Telephone & Telegraph Company

IT IS A UNIQUE PLEASURE FOR ME TO BE AGAIN AT AN Armed Forces Communications Association gathering. I know of no group anywhere that is more important to the safety and security of this nation than this combination of the communicators of the Armed Forces and of the commercial communications companies. Besides, I know of no group where a greater atmosphere of friendship and cordiality exists, where more pleasure is to be derived from the associations which are in turn so valuable to our country.

When one thinks of communications for continental defense one tends to think of the more spectacular projects which are given wide publicity, or of those which are of such consequence in national affairs that the utmost secrecy must be preserved concerning them. With many of these the men and women of the communications industry have been closely associated. I would like to speak briefly of these.

A few weeks ago the Defense Department announced plans for the Distant Early Warning Line reaching from Alaska to Greenland by which advance notice of some six hours might be given should an attack on American cities be launched over the Polar Region. This is, of course, but one of the similar projects undertaken to warn our cities of the approach of an enemy. And to appreciate how great a part communications people play in these, it is necessary only to point out that this particular job involved men from seventeen telephone companies, from Western Electric, from AT&T's Long Lines Department, and from the Northern Electric Company of Canada. This should not strike anyone as too surprising. All such installations must not only be able to search out and identify the attacker—which is essentially a problem in communication—but they must be connected with one another and with the communication system back home.

But even their most optimistic advocates do not anticipate that such warning systems will prevent every attacking plane from getting through, and here again the skills and techniques of communications people have been called upon. The Army is now engaged in the development of bases near each of our large cities from which the Nike guided missile may be launched to bring down the plane that has not been disposed of by our interceptors. Nike is capable of tracking down and destroying an enemy plane no matter what its speed, how high it flies or what evasive action it takes. It does this by applying the same essential principles by which a telephone call is guided through a complex maze of equipment, perhaps over thousands of miles to the exact telephone desired. The brain of Nike is a development of communication science and is built by the same manufacturing processes that make communication equipment for peacetime uses.

But when the distant warning centers have sent word of the danger, and when Nike is being called on, the city's own defense forces are being alerted, and I need not stress before this audience how much a part of this process the communication companies have become. They are the means by which the civilian populace and its supporting agencies are mobilized and, should a bomb fall, become one of the chief reliances of the forces of rehabilitation.

Nerve System for National Defense

Working with the Air Force and with the Civil Defense authorities, we communicators have developed special devices and systems providing instant communication from observation points to control centers, between the control centers themselves, and for the prompt notification of police, fire, hospital and other essential services within each city. Within less than two minutes after the decision is reached at the Air Defense Control Center, it is possible

for all desired points, north and south, east and west, to receive an attack warning.

Our industry has been called upon by the government also to build communication facilities in Alaska which have become an important link in the network for national defense. Work has begun on a transatlantic telephone cable which will unite us more closely with the free nations of Europe by giving us more dependable and secret voice communication.

The contributions of the communications industry to continental defense, however, are not confined only to communications. The system we have built up in America has essentially been based on the closest kind of co-ordination between research, manufacturing and operation. David Lilienthal has told how, when he was head of the Atomic Energy Commission he saw the need for similar co-ordination in design and manufacture of atomic weapons, and how in 1949 he called on the Bell System, at the direction of the national administration, to take over the Sandia operation. Three years later, in 1952, Lilienthal said: "The stepped up production of bombs, and the favorable results in the test of new weapons, as officially announced from time to time, are, I am sure, in considerable measure due to the unique contribution of the Bell System and of the great scientific talents in the Los Alamos laboratory." Not long ago we announced the continuance of this arrangement with the government.

I have outlined some of the spectacular accomplishments of the communications industry and I am sure you

Rising to the applause of the crowd at the Annual Banquet is Major General George I. Back, Chief Signal Officer and vice president of the AFCA. In the foreground (l) are George W. Bailey, president of the Association, and Donald A. Quarles, Assistant Secretary of Defense for Research and Development. In the background can be seen (l to r) Major General Francis H. Lanahan, Thomas B. Jacocks, and William J. Halligan.

will guess there are many more that cannot be discussed. I want to emphasize that we make a mistake if we think of communications for continental defense solely, or even primarily, in such terms as these. The truth is that all these systems and devices, important as they are, are merely the outward fringes—appendages as it were—of the integrated nation-wide network which is made up of all of the communications industries in this country.

The real contribution of the industry to continental defense rests in the simple fact that any one of the millions of people who serve government and industry—in peace or war—can be in instant communication with any other such person anywhere on the American continent. *It is the American peacetime habit of using electrical communications universally that makes it a weapon immediately available for our defense.* In our modern wars it has been the nerve-system of our national effort, contributing mightily to ultimate victory. It multiplies manpower many times over and is one of the foundation stones upon which our great industrial superiority is so firmly fixed.

Banquet Invocation

Our heavenly Father, as we assemble here this evening primarily concerned with the Continental Defense of our beloved land, we are mindful of the magnitude and variety of the blessings Thou hast showered upon our nation. With all of her faults, and they are many, with all of her problems, grave as they may be, there is no other land we would rather call home.

We gratefully acknowledge having received from Thy hand, bounties beyond our needs, keys to unsuspected mysteries of Thy creation and having opened to us vistas of a life bordering on the miraculous. To man's shame, and we include ourselves, we must devote our time, our efforts and our energies toward the defense of the dignity with which Thou hast endowed us. It is our tragedy that we must dearly buy that which Thou has given. It is our glory that we can give ourselves to the preservation of treasures beyond price. May we, therefore, dedicate ourselves to the glorious, selfless service of humanity and, keeping our minds and hearts on Thee, be led from the tragic man-made gloom of strife and fear to the glorious light of fellowship and love. Hear our plea and bless us. In Jesus, our Saviour's name, we ask it. Amen.

J. FLOYD DREITH, CHC, USN

We have our great industrial system in America not because we need it for our defense. We have it because Mrs. Susie Jones, American housewife, would rather put a slice of bread in an electric toaster than hold it on a fork before a fire the way her grandmother did.

And in the same way we have our great telephone system in America not because we need it to defend ourselves against enemy bombers, but because Mrs. Susie Jones, American housewife, would rather telephone the grocer for that loaf of bread than walk two or three blocks in the rain.

Once Mrs. Jones learned to use the telephone to call around town, it was but a step to using it for calls to more distant points. Her husband has meantime been learning to use it in his business, and because of their joint needs we have the great nation-wide telephone network we have today. It is the Joneses and their needs that led to the invention of the switchboard, the loading coil, the vacuum tube and the transistor, and that now finds these and a thousand other devices ready at the nation's call.

Because it has become almost instinctive for the American to use electric communications, it has been economically possible to build the network that forms the basis of our defense system. The national communications network is widely dispersed over many routes and most of the large cities can be reached from several directions and

The Convention Chairman, Colonel Percy G. Black, sits at the headtable of the Annual Banquet with Captain L. S. Howeth, USN, Assistant Director Naval Communications, and Vernon Bagnall, past vice president of the AFCA.

by several means. If normally used circuits are interrupted, alternative routes are immediately put in service and additional ones are readily available. Our national communication system is a tremendous web that no catastrophe, not even the awesome H bomb, can effectively destroy. Even though some important part of this gigantic spiderweb should be destroyed, the rest will continue doing the job for which it was designed.

The same principle of diversification and re-routing applies within the large cities themselves. The communication wires and cables are mostly underground and are distributed through widely dispersed switching centers that provide continuity of service even though one part of the system may be destroyed.

So far as possible, all of us have attempted to anticipate the effects of an enemy attack by bringing to bear all the knowledge we have gained in thousands of individual disaster conditions—tornadoes, floods, explosions, fires. Whether these are the result of man's carelessness or nature's fury, they have at times resulted in great destruction over wide areas, calling for communications strategy and action very similar to what would be needed in an enemy attack. *Because communications people live continually in the face of natural disasters, they will be ready and able to cope with the disasters incident to war.*

In two world wars and in Korea, the ability of our industrial system to design and manufacture all the things needed to fight a war, may well have meant the difference between defeat and victory. And yet this industrial system is no better than the ability of all its parts to be in instant communication one with the other, and with the military organization they serve. Henry du Pont, a vice president of one of our very large industrial units, said recently, "Our industrial strength must be sufficiently robust to meet the challenge of any enemy; unless it is, we may reach that sorry day when there are no ramparts left to watch and none of us left on hand to watch them."

Ready to Serve Industry and Military

On behalf of the communications industry, I should like to echo that sentiment, and to say that we are ready and confident of our ability to continue to serve our matchless industrial system with the finest communication service the world has ever known.

Of even more importance than the industrial machine is the spirit and will of the people. Here, too, communications is of paramount importance and here again we far outstrip any potential enemy. In America, the people can be reached in a matter of minutes with any message their leaders wish to convey to them. When the government decided not long ago to spread the news of the hydrogen bomb explosion, the American people were promptly apprized of it by all their channels of information—newspapers, radio, television—all of which had at their disposal this same nation-wide integrated communications systems that Mr. and Mrs. Jones have had built for their comfort and convenience. This is a priceless heritage, however much it may be taken for granted, and it must at all costs be preserved.

A close-up of three distinguished AFCA members sitting at the Banquet headtable. (l to r) Major General Francis H. Lanahan, Deputy Assistant Chief of Staff, G-4; Thomas B. Jacocks, president of the AFCA Washington Chapter, and William J. Halligan, past president of the AFCA and president of Hallicrafters Company, Chicago.

All of us must consider the preservation and expansion of that communications system to be our major responsibility. In saying this I speak not only for the Bell System but for every segment of our communications industry. We have all grown up together, and while we may have differed among ourselves at times, we have always held the same ideals, the same desire to serve, the same passionate devotion to the safety and welfare of our country.

We must operate every part of this great system in such a way that it has the continuing esteem and confidence of the free American people who are after all our only masters.

We must conduct research to see that new instrumentalities are developed, manufactured to Service-dictated specifications, and then applied in the public service as rapidly as possible.

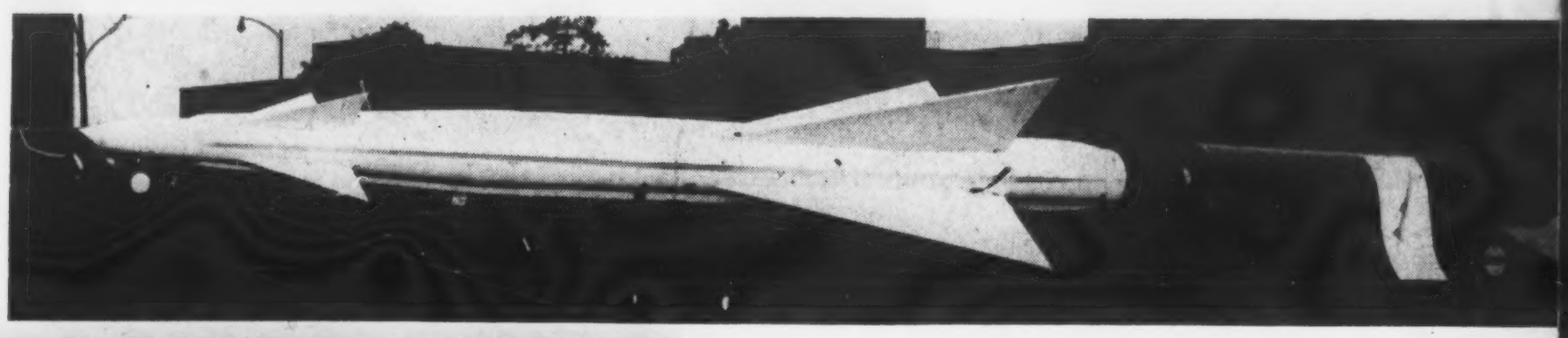
America's communications system owes its success to its development as a private enterprise under intelligent but not restrictive public regulation. We stand as a shining example of what this sort of freedom can accomplish as opposed to the government owned systems of the rest of the world. We must be sure that the American people and their representatives understand the fact that our strength and our efficiency, our service to them, rests upon the administration of this system in such a way as to

(*Continued on page 66, col. 2*)

Enjoying the Banquet are: (clockwise) Mrs. John J. Jones; Mr. Francis Engel of RCA, Washington; Mrs. W. Walter Watts; Mr. Robert Finlay of Ridgewood, N. J.; Mrs. Engel; Mr. John McGrew; Mrs. I. R. Saddler; Mrs. McGrew; Mr. Ivan R. Saddler of RCA, Washington, and Mrs. Finlay. Mr. Engel was program chairman for the Convention.

Convention Highlights. continued from page 17

Naval Ordnance Laboratory



The Nike

Part of the program during the NOL tour was a visit to the aeroballistics ranges. Members in this picture are assembled to see a demonstration of the atmospheric, free flight range.

During the tour of the Naval Ordnance Laboratory, White Oak, Maryland, members of the AFCA saw this electronically controlled remote operated twin 50 calibre gun turret which was displayed by the Wright Air Development Center, Wright-Patterson AFB especially for AFCA tour.

People and Parties

Above, engaged in conversation at the pre-Banquet Industry-sponsored Cocktail Party are: (l to r) Mr. and Mrs. J. Goodman of New York (Robco); Mr. and Mrs. John F. Gilbarte, Washington (Admiral Corp.), and Mr. and Mrs. Raymond L. Gilbarte, Red Bank, N. J. (Admiral Corp.). Mr. John Gilbarte is vice president of the Washington Chapter and Entertainment Chairman of the Convention. In the picture at the right, Frank D. Newberry, Assistant Secretary of Defense for Applications Engineering, and Mrs. Newberry assemble before the Banquet with Convention members.

Below, more tables at the Banquet. A group of Washington Chapter members and guests in the picture at the left are: (counterclockwise) Harry M. Stephey, Philco; Dr. A. Kossiakoff, Johns Hopkins Applied Physics Laboratory, Silver Spring, Md.; Mr. Megs Brearley, Electronics Division, Navy Bureau of Aeronautics; R. T. Connell, Philco; Col. Robert Barrow, USAF, and John Compbell, Philco. The four gentlemen seated together in the other photograph are: (l to r) Mr. Arthur J. Stobbart of Temple Technical Institute, Philadelphia; Mr. William H. Beach of the Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn.; Mr. Karl Pittelkow also of the Bridgeport company, and Mr. Walter W. Clarke of Western Electric, Burlington, N. C.

USAF Programming for Communications-Elec

THE GROWTH OF THE UNITED STATES Air Force and its ever-increasing use of electronics facilities has made Air Force communications-electronics units "big business" agencies. The activities of these units require the application of sound, "big business" management practices. To accomplish this, new management "tools" are now being used by the Air Force communicators to plan and supervise the numerous fixed communications-electronics facilities that exist or are planned for every Air Force installation. These are the PC document and the Standard Facility Equipment Lists (SFEL's)† The PC document is officially known by the title: USAF Program, Communications-Electronics. The basic authority for these publications is contained in an Air Force regulation (AFR-100-46), a forthcoming manual (AFM-27-1) and an Air Force technical order (T.O. 16-1-338).

With this ever-increasing use of electronics within the Air Force, accompanied by the vast annual outlay of funds to provide the electronics gear, it became apparent that a flexible management device was required. The new programming "tool" (the PC document) had to:

a. provide the means for maintaining the C-E program in phase with the base utilization program;

b. permit the Air Force to plan its future C-E facility requirements well ahead of the dates on which they must be ready for operation;

c. provide a system for supervising the progression of the C-E facility program toward those dates;

d. insure maximum utilization of all available C-E equipment stocks on hand; and,

e. provide a single official document to indicate Headquarters USAF approval of the requirements.

The newly established PC/SFEL procedures provide the means for translating the long-range Air Force plans and program objective into C-E facility and equipment requirements. These procedures establish a system which provides the means for:

a. estimating requirements in advance of required activation or deployment dates;

b. considering the funding, procurement, and installation lead-times; and,

c. permitting accurate computation of minor items, hardware, installation costs, and future maintenance support requirements. In addition, this PC document provides an inventory of world-wide fixed C-E facilities which, under the former system, was contained in thousands of separate manila folders, each marked by a separate project identifier. The mere fact that the new PC procedure makes it possible to take into consideration the all-important lead-time factors is in itself indicative of the streamlining of C-E facility programming with the Air Force.

Before going into the specific details of the PC document and the related Standard Facility Equipment Lists (SFEL's), it may be desirable to define "programming," to understand the factors that must be known for proper programming, and to examine how the PC document includes these required factors. First, "programming" may be defined as the projection of a series of positions through which the AF must pass in going from where it is now to where it should be at some designated time in the future as indicated by the authorized AF objectives. The program periods are expressed in terms of end of fiscal years, end of fiscal quarters, or any other time period. Within these program periods are various program positions which are described in terms of numbers of aircraft, personnel, installations and units.

One Basic Program Document

The preparation of the Air Force program begins with the statement of broad policies by the National Security Council, and the more specific objectives as approved by the Joint Chiefs of Staff. Utilizing this as the basic guidance, the Air Force publishes a document indicating fiscal year objectives announcing the Air Force goals for the various program periods. With this information as the basis, the other program documents are prepared to give the more specific details of the Air Force program. The first of these is the Program Guid-

by Major Howard B. Briley, USAF
Directorate of Communications
Headquarters, U.S. Air Force

r Fixed

ectronics Facilities

ance (PG) which provides the basis for the development of the other documents in the programming series. These cover such subjects as base utilization and unit deployment (PD), aircraft inventory (PX), military personnel (PT), flying hours (PF), unit priorities (OPU) and the one with which this article is concerned, the Communications-electronics program (PC). In addition to these established program documents certain supplementary program data is published, such as the Electronics Countermeasures Program Guidance prepared by the Directorate of Communications, Headquarters USAF.

Related to but not a part of the program document series are three very important publications which play a major role in the development and implementation of the Air Force Program: the Materiel Guidance; the Call for Budget Estimates; and the Call for Public Works Estimates. These publications provide the guidance necessary for obtaining the funds and procuring the equipment required to support the Air Force program.

The guidance contained in all these publications is applicable to specific fiscal periods and a single series will contain instructions for the operations that will take place during the remainder of the current and the ensuing fiscal year, as well as the planning factors for the later fiscal years. For example, the P-57-1 programming series will begin with the publications to be issued in February 1955 and will contain the information for the preparation of the financial plans to support the operations for the remainder of the Fiscal Year 1955 and the ensuing Fiscal Year 1956 and will indicate the planning factors for the initial computations for the FY 1957 budget estimate. Significant changes in the Air Force program may require revisions to the published documents and may warrant the establishment of a new program series identifier. For example, a significant change to the P-57-1 series may require that a new identifier as P-57-2 be established to indicate the revised program goals.

All Operating and Programmed Facilities Listed

The preparation of the PC document for the communications-electronics program of any specific program series begins after the publication of the Program Guidance (PG) and the Base Utilization and Major Deployment Program (PD), since it is designed to support the specific programs established by these two documents. The starting point in the development of any program requires two factors: a statement of objectives and a knowledge of the current AF position. In the PC document the statement of objectives is expressed in terms of total programmed facilities, while the current position is shown by the facilities coded to indicate that they are in place and operating. The PC document indicates these facilities, to the maximum extent possible, in terms of the Standard Facility Equipment Lists (SFEL's) described below. At the present time, certain items are still programmed by equipment names and the base telephone and intercommunications systems are indicated in terms of numbers of lines or station capacity. It is planned to develop the PC document to the point where all facilities will be expressed in terms of SFEL's.

As previously mentioned, the PC document lists all operating and all programmed facilities. This listing is accomplished by indicating on a separate page or pages all C-E facilities installed or programmed for each Air Force installation in the United States and overseas. To illustrate the magnitude of this publication, the PC-55-3 document contained a total of approximately 2,600 pages in three volumes. A total of 1,043 of these three volumes were distributed throughout the Air Force and other agencies. This required the Statistical Services staff within Headquarters USAF to prepare 56,300 electrical accounting cards, since the procedures adapted for use in C-E programming have been designed to make the maximum possible use of electrical accounting methods. This is an important point that should be borne in mind. It will be shown later that every facility number, SFEL designator, status code and other types of entries have been designed

to use electrical accounting procedures not only for preparation of the basic document but to prepare analyses of the C-E program. Utilizing these procedures, it is possible to determine the total number of any one kind of facility that is in-use and/or programmed for installation during any fiscal quarter of the Air Force program. A further breakdown of these facilities can be made by utilizing the punch cards for SFEL's, which makes it possible to determine the quantity of installation hardware and minor support items required to install the Air Force fixed facility C-E program. This detailed information, particularly the in-use inventory data, makes it possible for the first time to compute the logistic support requirements for this program, replacing the "Guesstimate" factors formerly used in computing this support. This previous lack of accurate inventory and programmed facility data was one of the major inadequacies in the earlier procedures which contributed to the break-down of the logistic support.

Document Page Explained

Figure One illustrates the format of the PC document and some of the sample entries used within this publication. This is not a typical page but is shown here to indicate the various columns, functional facility titles, and codes used. The first entry at the top of the page indicates the name of the appropriate Air Force base or installation, geographic location, and command having jurisdiction. The first column contains the facility number which indicates two things: the first digit indicates the general type of facility, i.e., 0 for Base Wire Plant, 2 for Navigational Aids and Flight facilities; and the last three digits indicate the specific functional facility, i.e., 201 for Control Tower, 221 for GCA Radar Approach System, 317 for Teletype Operations Relay Center and 401 for Fire Crash Communications System. This numbering system makes it possible to identify the specific function for which the facility is being provided. For example, facility number 3421 is the same type of facility as 4421 but the specific function is indicated by the first digit: 3421 being a facility within the Air Force Global Communications System while 4421 is a facility within Other Intercommand Systems.

The next large column gives the facility title, the specific SFEL's that are programmed for a facility, and remarks. The Status column uses various codes to illustrate facilities that are in-place and operating (A), programmed (P), interim (I), and others, all of which are identified in the Code page of the PC document. The Operating Date column indicates by fiscal quarters, 155 meaning the first quarter of Fiscal Year 1955, when programmed facilities are scheduled to become operational. The last two columns indicate the agencies responsible for engineering and installing the facilities and operating the facilities, respectively. The blank space between the Operating Date and Engineering-Installing Agency columns has resulted from revising the PC format. There are several ideas being considered for inclusion in this space; however, this will not be announced until it has been determined what desirable information can be included that will contribute most to an improved C-E program.

With this understanding of the PC document, let us now turn our attention to the Standard Facility Equipment Lists (SFEL's). These are not to be confused with the Facility Number previously discussed which refers to a complete communications facility. The SFEL is, in general, a bill of materials for a specific equipment or combination of related equipments. It lists major and minor items of equipment and the hardware required to place a major item, or a combination of major items, into an integrated functional condition to satisfy a specific operational requirement. These lists are prepared by the engineering agencies, the Directorate of Maintenance-Engineering, Headquarters USAF, the Air Materiel Command, and the Airways and Air Communications Service, to fulfill the requirements prescribed in the SFEL operational description. These operational descriptions are prepared by the Directorate of Communications or other air staff agencies within Headquarters USAF, or they may originate within lower echelons when the need for a new facility is recognized. At the present time there are approximately 380 separate SFEL's. They cover every conceivable requirement for a communications facility, from a complete control tower, a radar air traffic control center, or an air defense radar, to a single power generator. The size of these lists may vary from a single item, as in the case of the UHF Direction Finder unit, to approximately 210 line items of all types for the Permanent Base Radar Approach System. The reason for this variation is to a large extent traceable to the size and self-sufficiency of the major items. The UHF/DF is virtually self-contained, while the radar approach system SFEL must provide the hardware and installation items necessary to install the search radar, the precision approach radar, and the associated communications equipment as an integrated radar approach facility. The items in the SFEL's range from the $1,500,000 air defense radar to the one cent steel washers or nuts.

As in the case of the PC document, electrical accounting methods have been employed in the preparation of the SFEL's. At the present time there are approximately 35,000 punch cards maintained in the SFEL file. These punch cards are prepared to list the supply stock number, nomenclature, unit of issue, quantity, total cost, unit cost, and Air Force budget project for every item contained in the SFEL. It is this detailed use of electrical accounting methods, both in the PC document and the SFEL, that makes it possible to automatically compute the initial requirement and the support requirements for the Air Force fixed facility communications and electronics program. It is this use of automatic computation methods that will make it possible to have the equipment required at the time and place it is required, and will insure the success of the communications and electronics support of the ever expanding Air Force.

Operational Plan to Engineering Agency

Up to this point we have discussed only the PC document and the Standard Facility Equipment Lists. These are the "tools" of the Air Force communicator in establishing his requirements for the support of the base utilization program. The publication of these requirements in the PC document, which will normally be done by revising the pages of the document for the Air Force base or installation concerned, indicates Headquarters USAF approval. Upon receipt of this approval the Air Force communicator will forward to the designated engineering-installation agency an approved operational plan for the facilities requiring installation action. It is this operational plan and its receipt by the engineering agency that begins the series of events required to place a facility in operation. This series of events will include such actions as site surveys, land acquisition, construction planning and funding, C-E scheme preparation, equipment supply, and the final installation and acceptance inspections. These actions are primarily supervised by the engineering and supply agencies, the specialists in their particular fields.

Here again we find another feature

(*Continued on page* 79, *col.* 1)

USAF PROGRAM: COMMUNICATIONS AND ELECTRONICS

FACILITY NUMBER	INSTALLATION NAME / GEOGRAPHIC LOCATION / FACILITY DESCRIPTION / REMARKS – EQUIPMENT	COMMAND	STATUS	OPERATING DATE		ENGINEER AND INSTALL	OPERATING
	Smith Air Force Base Washington D C	SAC					
0	Base Wire Plant						
0011	Govt Admin Telephone System 0400 Lines		A				SAC
1	AC/W Facilities						
1104	EW/GCI Radar Station 0001 FC-1A-01A, 0001 FC-1C-01A, 0001 FC-3 -09		P	155		AMC	ADC
2	Nav Aids and FLT Facilities						
2201	Control Tower 0001 FA-1 -01		A				ACS
2221	CPN-4 Radar Approach System 0001 FA-3 -02		AI				ACS
3	AF Global Comm System						
3421	Ratt HF Mux Med Power One Circuit to Jones AFB 0001 FB-1A-01, 0001 FB-5B-02, 0001 FB-5A-01		AT				ACS
4	Other Intercommand Systems						
4421	Ratt HF Mux Med Power One Circuit to Brown AFB 0001 FB-5A-01, 0001 FB-5B-02, 0001 FB-1A-01		PT	454		ACS	ACS
5	Weather Communications						
6	Theater, Command & Base Comm Systems						
7	Training Facilities						
8	Research, Development & Test Facilities						
9	Special Projects						

X	Smith Air Force Base	SAC	AS OF 1 Mar 54	Page 1 32	X

AFHQ FORM O-801A. 1 MAR 54 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

GLOSSARY OF STANDARD FACILITY EQUIPMENT LISTS DESIGNATORS

FC-1A-01A—Early Warning Radar, AN/FPS-3, Temperate.
FC-1C-01A—Height Finder Radar, AN/EPS-4, Temperate.
FC-3-09—AC&W Intra-Site Communications, Inside Plant.
F-1-01—Basic Control Tower.
FA-3-02—Semi-Fixed or Mobile Radar Approach System, AN/CPN-4.
FB-1A-01—Multiplex Radioteletype High Frequency Receiver.
FB-5B-02—High Frequency, 3KW Transmitter, CW, Voice, or Radioteletype.
FB-5A-01—High Frequency Multiplex or Single Channel Radioteletype Frequency Conversion Kit.

PHEBCO,

A New Progressive Electron cs

Three men in Baltimore set their sights ahead—and, in two years, the future has lived up to their expectations of electronically serving Industry and the Services.

Seated in the Conference Room at Phebco, Inc. are the founders and officers of the company. (l to r) Thomas T. Eaton, secretary-treasurer; John M. Pearce, president, and Philip A. Hoffman, vice president.

Eight members of the engineering department of Phebco are shown at their desks. Mr. Eaton is standing in the background.

IT HAS BEEN THE DESIRE OF MANY engineers to start their own company, to be able to achieve the type of operation which is ideal from their point of view—such was the ambition from which Phebco came forth.

Three engineers, long experienced in the electronics field—John Pearce, Philip Hoffman and Thomas Eaton—incorporated as Phebco on May 1, 1952. Today, after two years of growth and achievement, they employ over forty people, of whom twelve are qualified technical personnel with many years of diversified experience in the electronics field. This experience is utilized for the development, design, and manufacture of complex electronic equipments.

In engineering a fund of knowledge, particularly in the guided missile field, in systems analysis and circuitry, has been invaluable in the development of missile systems test equipment—also in instrumentation, telemetry, radar and industrial applications. The capable mechanical design group gives a well balanced view to the packaging and fabrication of all types of chassis and equipment. Much of the work has been in the airborne field requiring sturdy compactness and light weight. Electronics development and manufacturing requiring a strong engineering view-

INC.

ics Company

An engineer works on a circuit development problem in the laboratory at Phebco.

point is therefore the particular flair of this organization.

In the instrumentation field, Phebco has developed a new Subcarrier Oscillator for the FM/FM telemetering system. Utilization of a "bridged T" circuit instead of the usual conventional multivibrator simplifies this unit whereby it is produceable at a substantially lower price. These new oscillators are stable over wide temperature and humidity variations. The development and manufacture of this item has been very helpful in extending the techniques of testing and type acceptance over a wide range of environmental conditions. The frequency drift is less than 3% of the deviation for a change in temperature of minus 10 degrees C. to plus 70 degrees C. Each oscillator is subjected to the complete environmental and stability tests before shipment.

A particular specialty has been the development and manufacture of "Systems Test Equipment"—particularly in the guided missile field. Many projects have been successfully completed in this category—these projects require a very thorough understanding of the basic missile system,

→

Telemetering oscillator, terminal board layout.

either guidance or control, and a close liaison with the customers' engineers and equipment development. These projects have varied from simple single chassis units to complex automation devices which will check operationally a complex system in minutes—a test which, if conducted manually, would take several hours.

A novel unit now being developed and produced is an automatic Telemetering Test Set. This was developed in conjunction with Goodyear Aircraft Engineers. A complete check-out of the R. F. system and of any of the 23 R. D. B. subcarrier frequencies can be set up. Indicating lights will show the results—whether on frequency, high or low—and, when a discrepancy is encountered the test automatically stops until a recording or adjustment can be made and then a button is pushed and the test continues through the remainder of the sequence.

Many large developmental engineering organizations are in need of help in the development of highly specialized "Systems Test Equipment." It is most advantageous to these groups to keep their highly skilled engineers in the primary system development—to utilize outside assistance it is necessary to find a

group of engineers experienced in the radar and missile fields—both in systems, circuitry and actual field use. Such experience is available at Phebco, their key personnel having experience on Matador, Oriole, Terrier, Talos and other well known missile programs.

Several missile contractors, aware of this unlimited broad experience, have contracted for Phebco engineers to work along as an integral unit of their engineering department to combine and assimilate ideas and quickly develop a design of test equipment which can be economically fabricated by Phebco facilities.

Phebco also has prime military contracts with many branches of the U. S. Department of Defense including the Bureau of Aeronautics, Signal Corps Supply Agency, Frankford Arsenal, Naval Ordnance Laboratory, Wright-Patterson Air Force Base, Air Force Cambridge Research Center, and Gentile Air Force Depot. These contracts cover a wide variety of applications from special test equipment to airborne magnetometers, both manufacturing and equipment development engineering and study contracts.

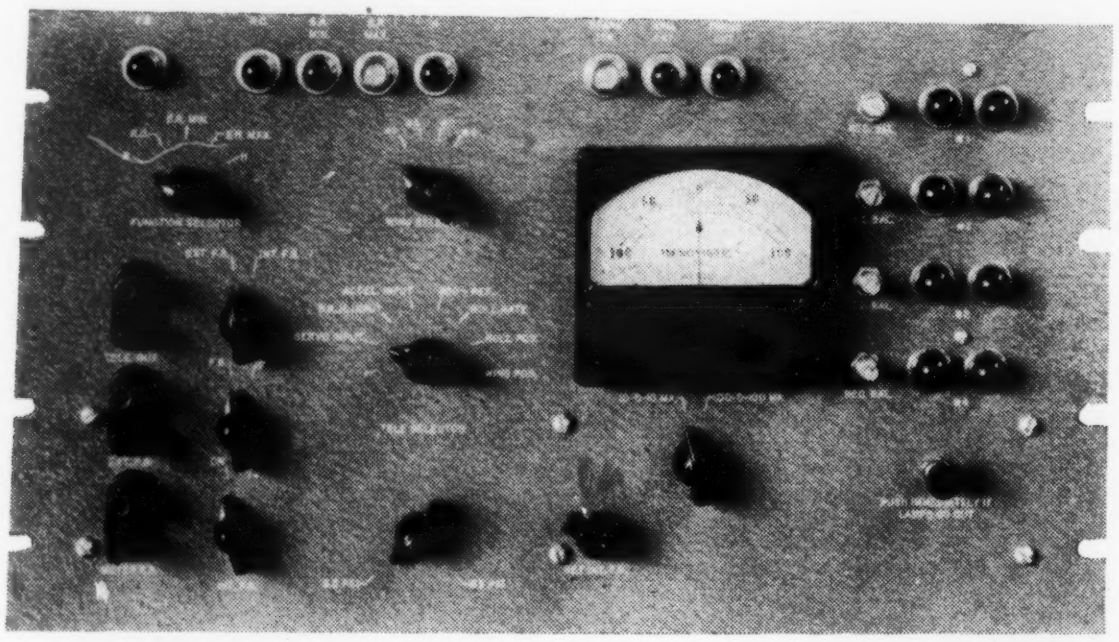
Phebco has developed numerous interesting proprietary equipments including;

1. Analog-to-Digital converter utilizing novel conversion techniques.
2. Transmission link equipment for the control of broadcast transmitters.
3. Special purpose magnetic amplifiers.
4. Integrators, both strain gauge and the thermocouple, to produce electrical impulses at a rate proportional to the magnitude of a thermocouple or strain gauge signal. When used in conjunction with a counter it forms a convenient device for direct time integration of elasticity or temperatures.
5. Radar simulator—simulating radar signals and presentations.

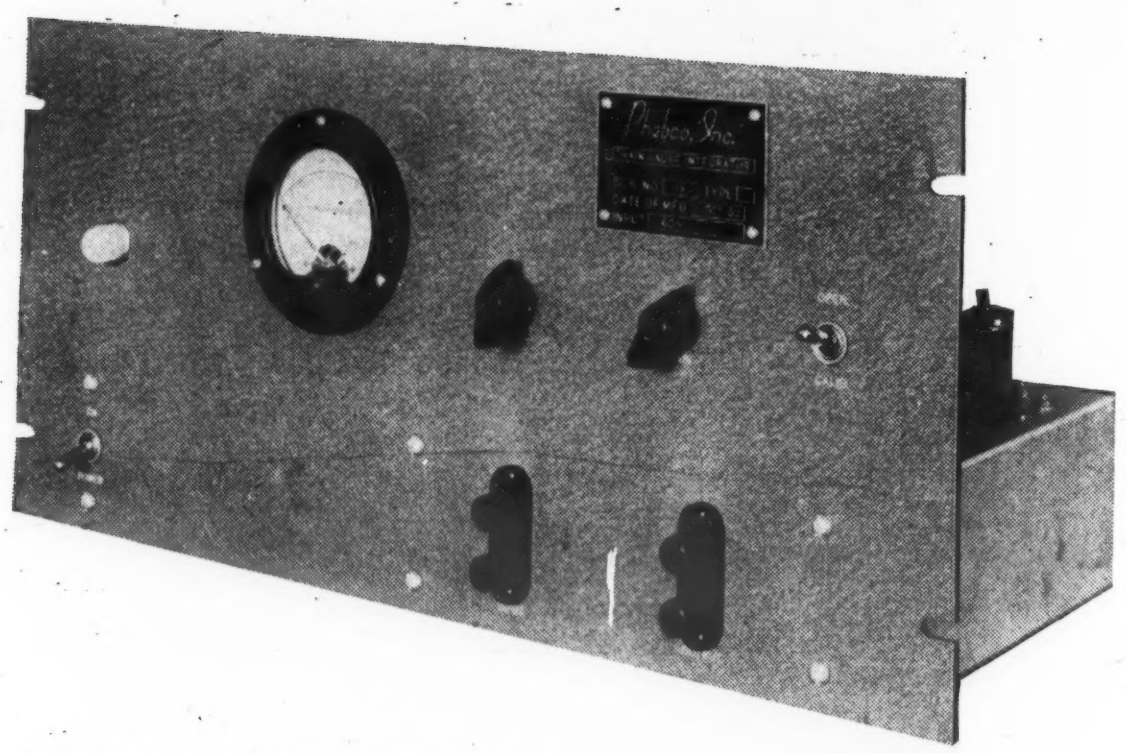
Phebco is a service organization both for Industry and the Armed Services. It offers an experienced staff for the development and manufacture of intricate electronic systems and devices. In its comparatively brief period of business, Phebco has a proven record of orderly growth and accomplishments. Indicative of its record is the return of many of its satisfied customers for further projects.

It is the goal of Phebco to become one of the best small electronic companies in the field, with a record of achievement in efficient design, good, fast workmanship, and low cost.

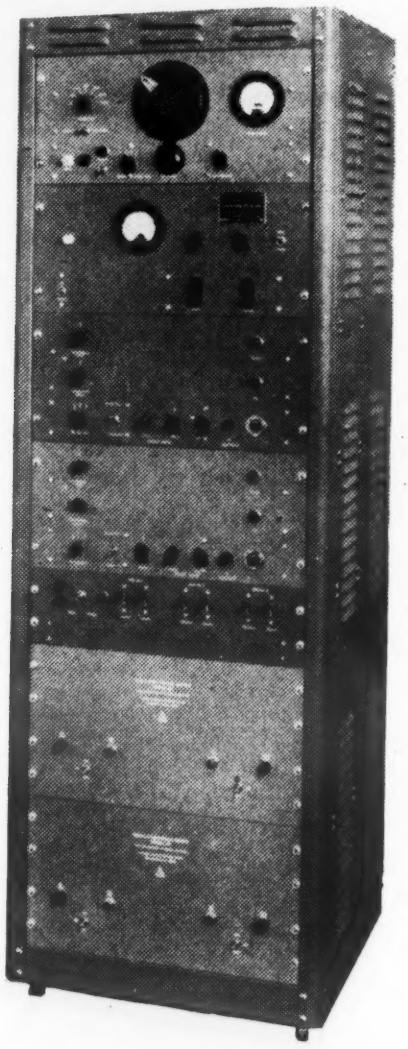
Test Equipment



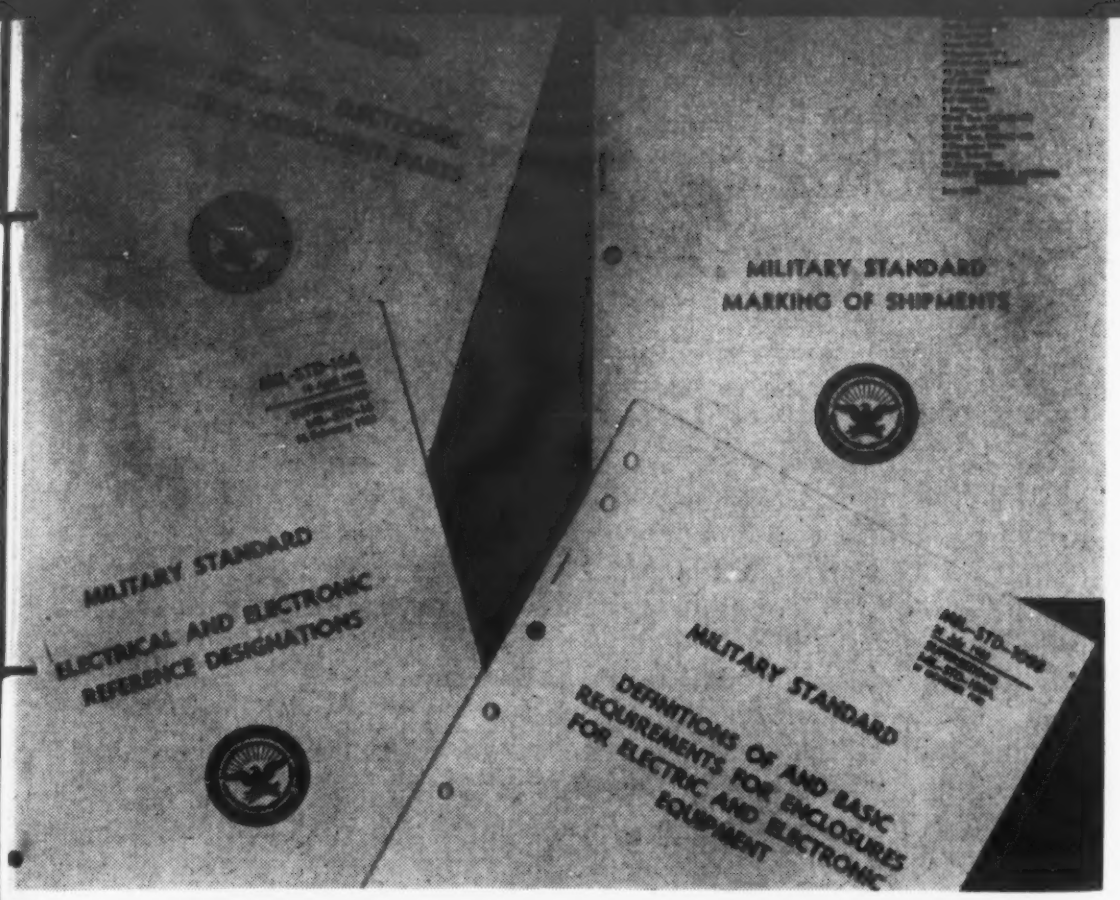
Control box for radar testing



Strain gauge integrator for production testing of elastic materials



Random noise generators for radar testing


MILITARY STANDARD
ELECTRICAL AND ELECTRONIC REFERENCE DESIGNATIONS
MILITARY STANDARD
MARKING OF SHIPMENTS
MILITARY STANDARD
DEFINITIONS OF AND BASIC REQUIREMENTS FOR ENCLOSURES FOR ELECTRIC AND ELECTRONIC EQUIPMENT

Second of two parts

by Margaret P. Haskin

Specifications and Standards Branch
Bureau of Ships, Department of the Navy

Catching Up with Specifications, Standards & Qualified Products Lists

In this, the second part of her series, Miss Haskin concludes the detailed explanation of Government buying procedures. Having dealt with specifications in Part I, she now discusses important data on standards and qualified products lists.

THE VALUE OF INDUSTRY STANDARDS HAS BEEN PROVEN MANY times. Since Government standards are actually the result of coordinated efforts of Government activities and Industry, the same benefits should be realized from them as have been realized from industry standards.

In November, 1951, in compliance with a request from the President that areas of understanding be developed between the Administrator of General Services and the Secretary of Defense, the following definitions of standards issued by Government activities were established:

> Standards—Documents, which may be used in invitations for bids, proposals and contracts, that establish engineering and technical limitations and applications for materials, processes, methods, designs, drafting room and other engineering practices or any related criteria deemed essential to achieve the highest practical degree of uniformity in materials or products, or interchangeability of parts used in those products.
>
> Federal Standards—To cover engineering and related practices and shall be mandatory for use by all Federal activities.
>
> Military Standards—To cover engineering and related practices and shall be mandatory for use by all Military activities.

Federal standards are developed with a view toward achievement of the following objectives: Reduction in the number of sizes, types, and grades of items used by Federal agencies; Reduction in the types of packaging used, consistent with economy and efficiency of operations; Uniformity of dimensions or other characteristics which will facilitate interchangeability and replacement; Uniformity in the practicies and processes required in the manufacture, preservation, packaging, inspection, and acceptance of items to achieve maximum economy; Uniform terminology and definition of technical, engineering, and supply practices and processes.

Federal standards are identified numerically. For example: Fed. Std. No. 5—Standard Guides for Preparation of Item Descriptions by Government Suppliers; Fed. Stad. No. 46—Paper, Mimeograph.

Military Standards In Two Forms

Military standards are issued to record agreements by the Military Departments to establish limitation applying to items, materials, processes, methods, designs, and engineering practices. Military standards are issued in two formats, book form and sheet form.

Book form (MIL-STD) standards cover engineering practices, charts, categories of dimensional and functional details, graphs, formulae and lists. These standards utilize textual or graphical presentation or both, and may be issued in unit page form when only one sheet is required. They are identified by the symbol "MIL" followed by a hyphen and arabic numerals as assigned to the standard. For example: MIL-STD-101—Color code for compressed gas cylinders and pipelines; MIL-STD-105—Sampling procedures and tables for inspection by attributes.

Military sheet form standards cover physical items and design features. They are limited to those dimensional and functional details required to insure interchangeability of the item. Military sheet form standards utilize graphical presentation combined with tabular presentation and notes if necessary. They are identified by the symbol "MS" followed by arabic numerals assigned to the standard. Examples are: MS 13928—Expander, piston ring, oil; MS 15000—Fittings, lubrication (hydraulic) acceptable tip designs.

Military standards are further divided administratively into "coordinated" standards and "limited coordination" standards. "Coordinated" standards are those covering items or areas of use common to more than one department and which have been concurred in by all interested activities.

"Limited coordination" standards are those prepared and issued by a single department or activity covering an area unique to that department or activity or to satisfy an immediate need for a standard which ultimately may be common to more than one department.

Limited coordination standards carry a suffix after the regular symbol to identify the issuing activity. Example: MIL-STD-213 (Navy)—Designation system for gas turbine engines, marine.

Changes to Military standards are made either by complete revisions or by means of revised pages. Revisions are identified by a capital letter and the superseding data. Revised pages carry the revision date.

Military book form standards include statements covering the purpose, application and effective date. For example, MIL-STD-2—Drawing Sizes, states under "Scope" that the drawing sizes covered therein shall be used by the Departments of the Army, Navy and Air Force in the preparation of drawings, and MIL-STD-214—Amplifiers, Audio Frequency, General Purpose, states that it covers the types and characteristics of general purpose audio frequency amplifiers to be used by the Military Services.

Although the definition and intent is the same for the two forms of Military standards, abuses have crept into the system of Military sheet form standards and they have been used to cover other than standard items. These abuses are due largely, it is believed, to the lack of a series of Military documents, such as standard drawings, to cover those items which need to be described by a drawing or sketch and yet may not be established as standard. In addition, the present format for sheet form standards does not provide for any statement of purpose, application, intent or implementation which would aid in prohibiting these abuses. Since their use is governed by the documents in which they are referenced (specifications or procurement documents) the original intent of a Military standard is often lost.

It is recognized that the system of Military standards, particularly sheet form standards, is relatively new and requires clarification and changes in administration. It is understood that the Standardization Division of the Office of the Assistant Secretary of Defense (Supply and Logistics) is now modifying the system to correct the deficiencies. In the meantime, in order to clarify their use and significance, Military sheet form standards prepared by the Bureau of Ships will include a statement of purpose and application.

Procurement of Federal and Military Standards

A complete list of Federal standards is published in the "Index of Federal Specifications and Standards" issued by the General Services Administration, Federal Supply Service. Copies of this Index may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The cost is on a subscription basis and includes cumulative supplements issued during the calendar year.

Copies of individual Federal standards may be obtained upon application accompanied by check to the Business Service Center, General Services Administration, Regional Office Building, 7th and D Streets, S. W., Washington 25, D. C.

Federal and Military standards approved for use by a particular Military department are listed in one of the three volumes of the Military Index. These volumes are: "Index of Specifications and Standards, Used by the Department of the Army, Military Index, Volume II"; "Index of Specifications and Standards, Used by the Department of the Navy, Military Index, Volume III", and "Index of Specifications and Standards, Used by the Department of the Air Force, Military Index, Volume IV." Copies of the volumes also may be purchased from the Government Printing Office. The prices are on a subscription basis and include a copy of the current basic semi-annual Index and five monthly supplements thereto.

Copies of individual standards used by the Army, Navy and Air Force departments may be obtained as indicated in the foreword of the applicable volume of the Index.

Since Government standards are continually being changed, it is the practice to furnish only the latest issue. Copies of superseded or cancelled standards are issued only when specifically required by an invitation for bid or an existing contract. In such cases, where a specific issue of a standard is required, the request should so state. It is recommended that whenever copies of standards are requested, the title as well as the number be given.

Qualified Products Lists Protect Final Product

Qualified Products Lists are issued by the Government to provide information as to the ability of manufacturers to provide products which will meet the requirements of Government specifications. They are issued *only* when the specification requires that testing must be accomplished prior to award of contract. Such requirements are necessary where the unsatisfactory performance of the product in service may endanger the lives of personnel or where complicated designs and the nature of time-consuming tests would cause undue delay in delivery of the product under contract.

The fact that a product has been tested and included on a qualified products list is evidence only that a manufacturer can make a product of a type and grade which meets the particular specification requirements. Such inclusion on a list does not in any way relieve the manufacturer of his obligation to maintain such quality. The listing does not guarantee acceptance of the product in any future purchase nor does it constitute a waiver of the requirements of the specification as to acceptance, inspection, testing or other provisions of any contract.

The Lists are not intended to restrict either bidding or awarding of contracts. *All manufacturers have an equal opportunity and are urged and encouraged to make application for testing of their products in order to insure their eligibility for award of contracts in those cases where qualification approval is required.*

Complete List of Suffixes for Identification of Limited Coordination Standards

Army

CmlC—Chemical Corps
CE—Corps of Engineers
Med—Army Medical Service
Ord—Ordnance Corps
QMC—Quartermaster Corps
SigC—Signal Corps
TC—Transportation Corps

Air Force

USAF—Dept. of the Air Force
ASG—Aeronautical Standards Group

Navy

NAVY—Dept. of the Navy
MC—Marine Corps
Aer—Bureau of Aeronautics
BuMed—Bur. of Medicine and Surgery
NOrd—Bur. of Ordnance
Pers—Bur. of Personnel
Ships—Bur. of Ships
S&A—Bur. of Supplies and Accounts
Docks—Bur. of Yards & Docks

Qualified Products Lists contain the Government designation of the product, the manufacturer's designation, the test or qualification reference and the manufacturer's name and address, including the address of the plant from which the sample was submitted.

Lists are identified by the symbol "QPL" followed by the number of the associated specification and a number to identify the issue of the list. For example: QPL-3125-1 indicates that this is the initial issue of the list associated with Military Specification MIL-P-3125, and QPL-P-R-791-2 indicates that this is the second issue of the Qualified Products List associated with Federal Specification P-R-791.

Changes to a qualified products list are made by revision or amendment. A revision consists of a complete new list identified by a new suffix number in proper numerical sequence—thus the revision of QPL-3125-2 is QPL-3125-3. An amendment consists of an additional sheet or sheets containing only the changes identified by date and the amendment number placed below the existent symbol.

For example: QPL-18-5
Amendment-2
1 October 1948
SUPERSEDING
Amendment-1
16 September 1948

Amendments are cumulative and each successive amendment is so written as to completely supersede the previous one.

Procedure to Obtain Qualification Approval

When it has been determined that qualification testing is necessary the following requirements and information will be contained in the specification covering the product:

(a) Section 3 (Requirements) of the specification will contain a requirement (usually paragraph 3.1) that the product furnished shall have been tested and passed the qualification tests.

(b) Section 4 (Sampling, Inspection, and Test Procedures) of the specification will state the tests to be made on the product.

(c) Section 6 (Notes) will contain a paragraph stating that the right is reserved to reject bids on products which have not been subjected to the required tests and found satisfactory for inclusion on the Federal or Military Qualified Products List, as applicable. This paragraph will also list the name and address of the activity responsible for qualification.

When a manufacturer desires to furnish a product covered by a specification requiring qualification approval, he should first review the specification and determine by actual tests whether his product falls within the performance or design limits of the specification. He should then contact the activity responsible for qualification named in the specification and request that his product be tested.

After a manufacturer requests qualification of a product, if the request is approved, the activity responsible for qualification will authorize the test and send the manufacturer necessary information including the following:

(a) A copy of the QPL Summary with a request for a certificate and statement from the manufacturer as required by the QPL Summary. (The QPL Summary is a leaflet publication covering the information to be furnished by the manufacturer and the rules that govern the testing).

(b) Instructions for forwarding the samples.

(c) Information as to payment of costs of tests.

After certification has been made by the manufacturer as required in the QPL Summary, qualification tests will be conducted at the laboratory designated by the activity responsible for qualification.

The activity responsible for qualification will notify the manufacturer of the results of the tests and whether the product has met the qualification requirements of the specification. If the product meets the qualification requirements of the specification, it will appear on the applicable products list.

The procedures described above have been established for Military qualified products lists. Since, at the present time, there are no known established procedures for Federal qualified products lists, most Military activities, when responsible for qualification under a Federal specification, operate in accordance with the established Military qualified products lists procedures.

Qualified Products Lists are always open for inclusion of products from additional manufacturers as their products are submitted and become qualified as a result of qualification tests. Manufacturers are urged to communicate with the activity responsible for qualification and arrange for tests on the products they intend to offer.

Procedure for Others Than Direct Manufacturers

A supplier, to be eligible for award of contract for furnishing an approved product manufactured by another firm, is required to state in his bid the name of the actual manufacturer, the manufacturer's designation for the product and the qualification test reference number. His bid will then receive the same consideration as bids for approved products from other sources.

A distributor or dealer who is completely responsible for the distribution of a product carrying his brand designation but manufactured by another company is considered eligible for listing on the qualified products list. In such cases the actual manufacturer is contacted to determine that the distributor or dealer is authorized to rebrand the product under his own brand designation. When such permission is granted the distributor or dealer, a sample of the rebranded product will be tested by the Government. If the product is approved, the qualified product list will show the brand designation of the distributor or dealer, the name of his firm as distributor or dealer, and the name and plant address of the actual manufacturer.

Qualification approval applies only to the product that is manufactured at the plant which produced the sample tested, unless an extension of approval is made by the activity responsible for qualification. Extension of approval may be made to the same product produced by other plants of the manufacturer when it has been determined by test of the product that it is equal in all respects to that of the qualified product. The amount of testing in these cases may vary from a few hours work to the complete redoing of all the qualification tests. The laboratory which made the initial test is usually assigned the task of identifying the product from the other plant. This identification is necessary because of varying conditions in plants due to labor forces, production line techniques, inspection procedures, differences in raw materials, and in some cases, variations in laws from one state to another.

Cost of Tests Depend on Government Interest

It is not intended that the Government shall act as a testing activity for purely commercial interests from which the Government derives no benefit. For this reason, charges for conducting qualification tests will be based on the interest of the Government in each particular case. Qualification tests will be conducted without charge to a manufacturer when the number of qualification approvals issued is so small that adequate competition has not been developed in industry and when testing has not established sufficient sources of supply to assure availability of the product in the quantity required. In other instances, costs of tests will be borne either by the manufacturer or divided between the Government and the manufacturer according to the best interests of the Government. Information regarding the cost of tests will be furnished the manufacturer by the activity responsible for qualification.

A product may be removed from a qualified products list for violation of any of the provisions upon which qualification approval was granted. The following are among the usual reasons for removal:

(a) The product offered under contract does not meet the requirements of the specification.

(b) The manufacturer is delivering a product different from the one originally qualified.

(c) The manufacturer has discontinued manufacture of the product.

(d) Request for removal by the manufacturer.

Except where the manufacturer has requested removal of his product, the activity responsible for qualification will notify the manufacturer of the proposed removal of the product from the qualified products list stating the reason for this action. The manufacturer will be invited to furnish comment on the proposed removal of his product. If determination has been made to remove a product, the activity responsible for qualification will notify the manufacturer by letter and, by means of a revision or amendment of the applicable list, will delete the product from the list.

In addition to the reasons for removal stated above, a product will be removed from a list if it does not meet the requirements of a revised specification. In this case, the manufacturer will be given the opportunity to submit new samples for test to determine compliance with the revised requirements. Removal action may be delayed pending the

(*Continued on page* 77, *col.* 1)

Facsimile Equipment Development in the Signal Corps

From a definition of facsimile to the detailed examination of the Signal Corps' newest facsimile set, the author presents a complete, up-to-date report on this phase of televisual communication.

by Richard B. Le Vino
Chief, Televisual Equipment Section
Coles Signal Laboratory
Signal Corps Engineering Laboratories

A FACSIMILE SYSTEM, BY ALL generally accepted definitions, is the breaking down of the picture or copy to be transmitted, into separate elements, transmission over radio or wire media to a recording equipment, and re-assembly of these elements into their original positions to form an exact copy of the original.

Facsimile, therefore, has many obvious military applications since it permits the transmission and recording of graphic intelligence in a form not possible by teletype, voice, data or Morse code techniques, such as sketches, maps, charts, photographs, ideographic languages, signatures, etc. However, since in most tactical military applications, facsimile transmissions are necessarily limited to the capacity of a voice channel, and do not enjoy the wide-band facilities available to television, practical field-type facsimile equipments must include precise mechanical components in addition to the customary optical components and electronic circuitry.

Again, as in the case of other televisual equipments, facsimile research and development may be divided into the tactical and fixed-plant fields.

The need for a facsimile equipment capable of the maximum utilization of available and planned transmission facilities under favorable and unfavorable operating conditions led to the establishment of requirements for Facsimile Set AN/GXC-3. This set is being developed, under contract with Hogan Laboratories, to provide the military services with flexible, versatile and reliable facsimile equipment suitable for both tactical and fixed-plant use under varied operating conditions over standard military or commercial wire or radio voice-frequency circuits and will replace Facsimile Set RC-120.

The new equipment will feature: automatic sequential operation from the stand-by condition to the completion of a transmission cycle; choice of three speeds of operation and two carrier frequencies to match quality of the available voice-frequency circuit; maximum utilization of the available circuit by the employment of vestigial side-band operation techniques; ruggedization for field and vehicular operation, and plug-in sub-assemblies for simplification of maintenance problems.

The equipment provides for the

transmission and reception of 8½" by 12" copy with a medium definition of 96 lines per inch and at operating speeds of 45, 90 or 180 lines per minute. At the maximum operating speed (used when the available voice-frequency circuit has good phase and frequency response) the transmission time for a nominal 8½" by 10½" page copy is approximately 5½ minutes. When the circuit is poor, satisfactory results may be obtained by using the lowest operating speed, for which the transmission time is approximately 22 minutes. Additional flexibility is afforded by the use of either an 1800 cps or a 2400 cps sub-carrier frequency, depending on the particular characteristics of the circuit in use.

Components of New Equipment

The set is composed of five major components:

1. A facsimile transmitter utilizing a rotating, dual optical head. The output signal is linear with the reflection density of the copy being scanned and will be either d-c picture frequency signals or sub-carrier amplitude modulated signals. Emphasis is being placed on the simplicity of the loading and operating procedures.

2. A continuous recorder, providing copy immediately available for use on direct-daylight type facsimile recording paper. Recording is accomplished by passing electric current through the paper by means of novel recording blades. Unattended operation is provided.

3. A photo-recorder capable of operating in daylight by means of a recording drum enclosed in a light-tight case. Recording is accomplished on film to provide either positive or negative copy which is essentially identical in tonal reproduction to the original scanned at the transmitter.

4. A converter-transmitting unit, used in a radio circuit to convert the output of the facsimile transmitter to either sub-carrier FM for modulating an RF carrier or to d-c picture frequency signals for use in a frequency shift radio transmitter.

5. A converter-receiving unit which provides facilities for converting the received radio signal to an amplitude-modulated signal for use by the facsimile recorder.

Each of the above components is a self-contained unit weighing 35 pounds, including power supply for either a-c or d-c operation.

In general, sub-carrier amplitude-modulated signals are used for wire-line transmissions and either frequency-shift signals or sub-carrier FM signals (amplitude-modulating an RF carrier) are used for radio facsimile transmissions. For transmission over a wire circuit, the vestigial side-band output of the facsimile transmitter, on either an 1800 cps or a 2400 cps carrier is transmitted directly over the wire circuit to the facsimile receiver. For long range radio transmissions, the converter units are used as shown in Figure One. For transmissions using an RF carrier amplitude-modulated by an FM sub-carrier, the vestigial side-band output of the facsimile transmitter is fed over the connecting wire link to the transmitting-converter whose sub-carrier FM output modulates the radio transmitter. For carrier shift transmissions, the d-c picture frequency output of the converter is available for use in the radio transmitter. If the facsimile transmitter is located a short distance away from the radio transmitter, carrier shift may be accomplished by feeding the d-c picture frequency output of the facsimile transmitter directly over the short wire link to the radio transmitter. The SCFM or carrier-shift signals may be received by an AM receiver having a stable beat frequency oscillator. D-C picture frequency signals may be fed directly from the radio receiving equipment of the facsimile receiver when the connecting wire link is short. When the facsimile receiver is located more than a few miles away from the radio receiver, or when the radio receiver output is SCFM, the facsimile converter-receiving unit is used. The converter will receive either SCFM or d-c from the radio receiving equipment and convert to amplitude-modulation for transmission over the connecting wire link to the facsimile receiver.

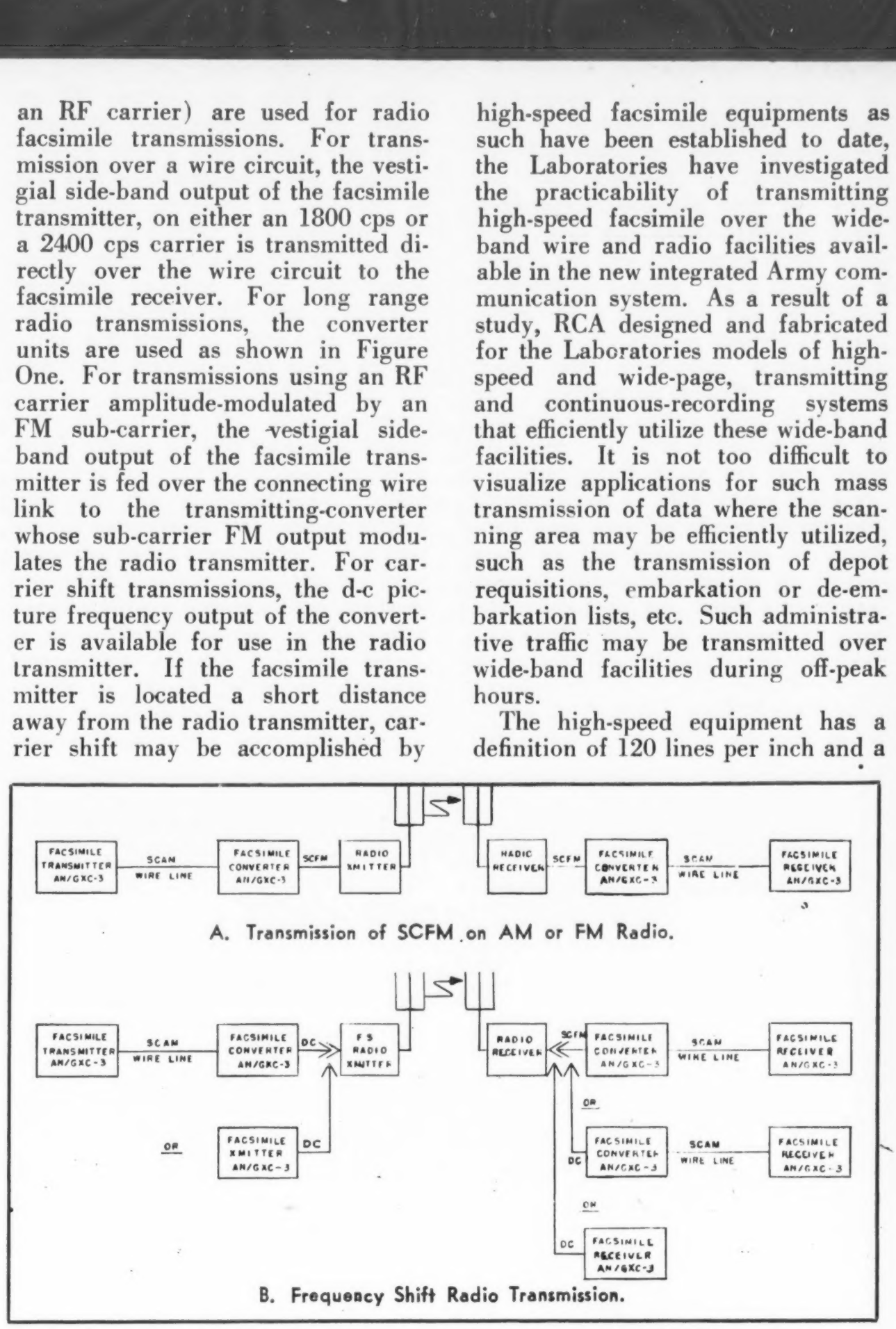


Figure One: Various system arrangements of facsimile set AN/GXC-3( ) for long range radio operation.

While no firm requirements for high-speed facsimile equipments as such have been established to date, the Laboratories have investigated the practicability of transmitting high-speed facsimile over the wide-band wire and radio facilities available in the new integrated Army communication system. As a result of a study, RCA designed and fabricated for the Laboratories models of high-speed and wide-page, transmitting and continuous-recording systems that efficiently utilize these wide-band facilities. It is not too difficult to visualize applications for such mass transmission of data where the scanning area may be efficiently utilized, such as the transmission of depot requisitions, embarkation or de-embarkation lists, etc. Such administrative traffic may be transmitted over wide-band facilities during off-peak hours.

The high-speed equipment has a definition of 120 lines per inch and a maximum (highest speed) keying frequency of 95 kilocycles and is designed to utilize a transmission facility of up to approximately 200 kilocycles in width. To provide versatility, the equipment was designed to operate on a frequency-division multiplex basis which makes it operable using 1, 2, or 4 transmission facilities each forty-eight kilocycles wide. The speed of operation utilizing four 48-kilocycle facilities, or one 192-kilocycle facility, is approximately 500 letter size pages per hour. When utilizing two 48-kilocycle channels the speed is reduced to one half the maximum speed. The scanner or transmitter is designed to accept copy up to and including 9 inches in width and is continuous, permitting the insertion of any reasonable length of paper without loss of circuit time and without special preparation of the copy.

The synchronization of the scanner and recorder is accomplished by a self-contained speed control system in each equipment, which uses as a reference, the frequency of a secondary frequency standard. As its synchronization is not transmitted from transmitter to receiver, it does not consume bandwidth and the synchronization is not affected during interruptions in the transmission facility. The receiver is a continuous type of facsimile recorder utilizing a multiple helix and printer bar technique. The marking is produced by the formation of a dark reddish-blue diazonium dye within the fibers of the paper by ionization of the electrolyte at the printing point. The paper is a high rag-content, chemically pure paper which is treated with the electrolyte within the machine. After recording, the paper is passed over heater bars which further develop the dye and dry the paper. Irradiation with ultraviolet light destroys the uncoupled dye intermediates, thereby "fixing" the copy.

Electronic Scanning Techniques Investigated

The wide-page equipment was developed to determine the practicability of transmitting and receiving large copy, such as the standard 32″ x 40″ weather map, in one operation, rather than in a series of transmissions of sections of the copy (as limited by copy capacity of present equipment) and assembly of the individual transmissions into one complete copy. This equipment was constructed concurrently with the high-speed equipment, has a definition of 120 lines per inch and will accept and reproduce originals in any size up to 32″ x 40.″ A drum type scanner is employed in the transmitter, the copy being held on the periphery of the revolving drum by a transparent plastic sheet. The scanning operation is initiated manually and requires approximately 20 minutes to completely scan a 40″ copy. It requires a 16 kilocycle wide transmission facility. Local synchronization is employed in this equipment and is very similar to the system used in the ultra-high-speed equipment built for SCEL. The wide-page recorder is also of the continuous type employing the dye coupling reaction for printing. In this machine, two helixes, one revolving five times as fast as the other, generate a scanning line 34″ long by the traverse of their point of intersection. This design was evolved to maintain the quality of reproduction without using an excessively large helix drum.

The need for improved scanning and recording techniques led to the award, in July 1950, to RCA Laboratories of a research type contract to conduct an investigation of electronic scanning techniques and continuous recording methods suitable for military use.

During this study of electronic scanning techniques, thorough investigation was made of scanning methods employing camera tubes, such as the Orthicon, Vidicon, Image Dissector, etc., and also cathode-ray flying-spot scanners. It was found that scanning by means of camera tubes showed considerable promise for the future, but that the available camera tubes were not well suited to facsimile applications. The flying-spot technique was therefore chosen for incorporation in an experimental model of a practical scanner which was delivered to SCEL at the completion of the work. Evaluation of the model is still in progress at the Laboratories but to date has been found to operate satisfactorily. The new techniques employed offer many desirable features, such as a simplified copy loading procedure on a flat surface, ability to scan copy in continuous form, pamphlets or thin books, and ability to scan a small portion of a page at any position on the page, thus giving enlargements of portions of the original at the receiver if desired. The magnification ratio is variable and can be adjusted to provide facsimile copy of any size in the range from full size to a 4 to 1 enlargement of any portion of the original.

Several recording methods were investigated, such as the Xerographic process, an Ink Gun process, a carbon paper type recorder and recording on the Land Camera type film, which requires a processing time of only one minute. In addition, the possibility of flying-spot recording using mechanical motion of the light spot rather than a cathode-ray tube, as used in the scanner, was considered. The carbon paper type of recorder appeared the most promising as far as the general requirements for a military facsimile gear are concerned and an experimental model was constructed and recently delivered to the Laboratories. The use of carbon and white paper is not new to the facsimile art. Earlier continuous carbon paper recorders, however, utilized the bar and helix principle and the pressure bar had to be precisely ground to match the helix. Moreover, the speed of response was low because of the weight of the bar and unless the bar was heavy enough to hold a precision lineup, uniformity of printing across the width of the sheet was poor. In the model, however, printing is accomplished by means of three stylii spaced the length of one scanning line apart on a traveling, sprocket-driven, endless belt. After one stylus has traversed the scanning line, the next stylus on the belt is brought into position to start the next scanning line, and so on. The magnetic frame of each stylus contains a coil which, when energized, causes the stylus to be pulled with sufficient pressure to mark the white paper through the carbon. When the current ceases, the stylus merely rides along, touching the papers, but with insufficient pressure to cause printing. Response speed is high as the motion required from white to black is very small. The recorded copy is not photographic in appearance and quality but the half-tone scale is adequate and fine detail very clearly printed. Appearance is more like an etching than a photograph.

Limitations of Speed Due to Phase Distortion

The Laboratories have recently initiated a program of study and investigation to determine the feasibility of developing a facsimile repeater which will reduce the effects on received fax copy caused by multipath propagation. Initial study will determine the differences in signal characteristics when received with and without multipath. Subsequent investigation will be directed toward exploring those techniques which appear promising in reducing multipath disturbances in the printing signal. These techniques will be integrated with the primary function of the repeater which is to convert fax signals received from single sideband or carrier-shift radio receivers to a form suitable for retransmission by either single sideband or carrier-shift radio transmitters. Consideration will be given to the requirement that recording equipment may be employed for storage of the fax signal prior to retransmission. If the study indicates the practicability of the repeating and storing device, it is planned to develop the equipment for ultimate application to long-range radio-facsimile circuits operated by Army Communications Service Division.

In the design of both commercial and military facsimile systems, it has long been necessary to materially limit the speed of transmission because of phase distortion encountered in the transmission of the facsimile signals. This has been particularly serious in equipments designed for use on wire lines, where phase distortion considerations generally limit the usable bandwidth to no more than

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AMPEX CORPORATION

MAGNETIC MEMORIES

by J. A. Ford
Ampex Corporation

SCARCELY A DECADE AGO MAGNETIC sound recording had just emerged from the laboratory. Many mechanical and electrical obstacles stood in the way of its development into a recording method which could hope to challenge the mechanical and photo recording media then used almost universally.

Today magnetic tape has proven itself to be in many respects a more dependable, more versatile memory than the human mind itself. Sound recording has reached a state of near perfection. Thousands of laboratory facts are stored on a few feet of magnetic tape, ready for immediate reference. Machines and processes can be controlled automatically by magnetic "brains."

The story of this rapid development closely parallels the history of the Ampex Corporation, a pioneer in the magnetic recording field despite only 9 years of existence, less than seven of which have been spent in the magnetic field.

Founded in 1944 by Alexander M. Poniatoff, from whose initials the company takes it name, Ampex was originally a manufacturer of precision, permanent-magnet type motors and generators used in airborne radar scanning devices. At the end of World War II, when defense contracts were cancelled, the newly-founded organization found itself without a market for its products.

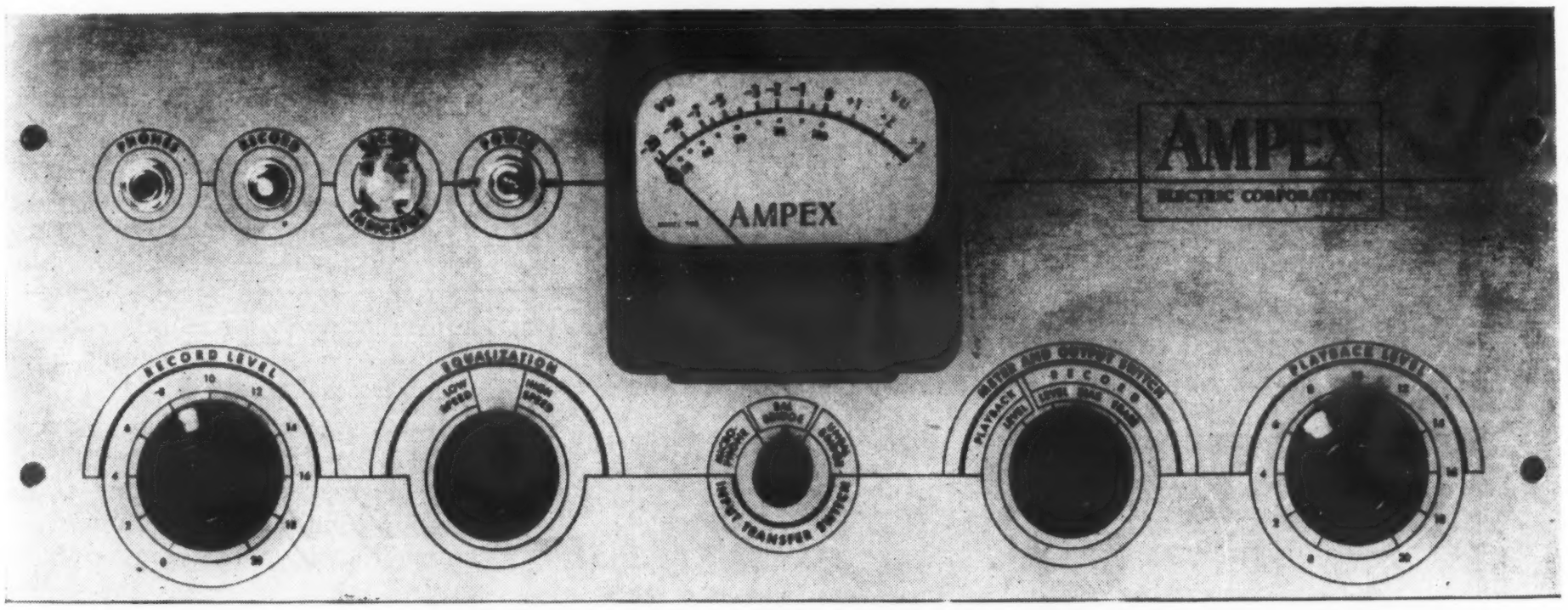
A search for a suitable post-war product of commercial value ended when Poniatoff witnessed a demonstration of the Magnetophon, a German tape recorder, which had been "liberated" by the U. S. Army. His life-long interest in high-fidelity sound reproduction, plus the fact that the tape recorder was a precision instrument of the type Ampex could build successfully in a competitive market, led to an immediate decision to build a tape recorder.

Poniatoff and his two leading engineers, Harold Lindsay and Myron J. Stolaroff, began development of the first Ampex recorder in April, 1947. Working with their knowledge of the Magnetophon, what little information on the subject that was then available at the Stanford University Library and their original ideas, the team developed and built the first machine by February, 1948.

Fate catapulted Ampex to the forefront of the magnetic recording industry. Bing Crosby's radio contract stipulated that, should his Hooper rating drop to 60, he would have to broadcast "live," rather than record his program on discs. The network felt that current recording methods were giving a "canned" characteristic to the show that was hurting its popularity.

Bing's Hooper rating fell to 62. Faced with the prospect of having to go to "live" broadcasting, he began a search for a recording medium that could not be distinguished from direct broadcasting. The rigid schedule of a series of "live" broadcasts would not fit his busy personal routine.

Electronic control panel on professional Ampex recorder.



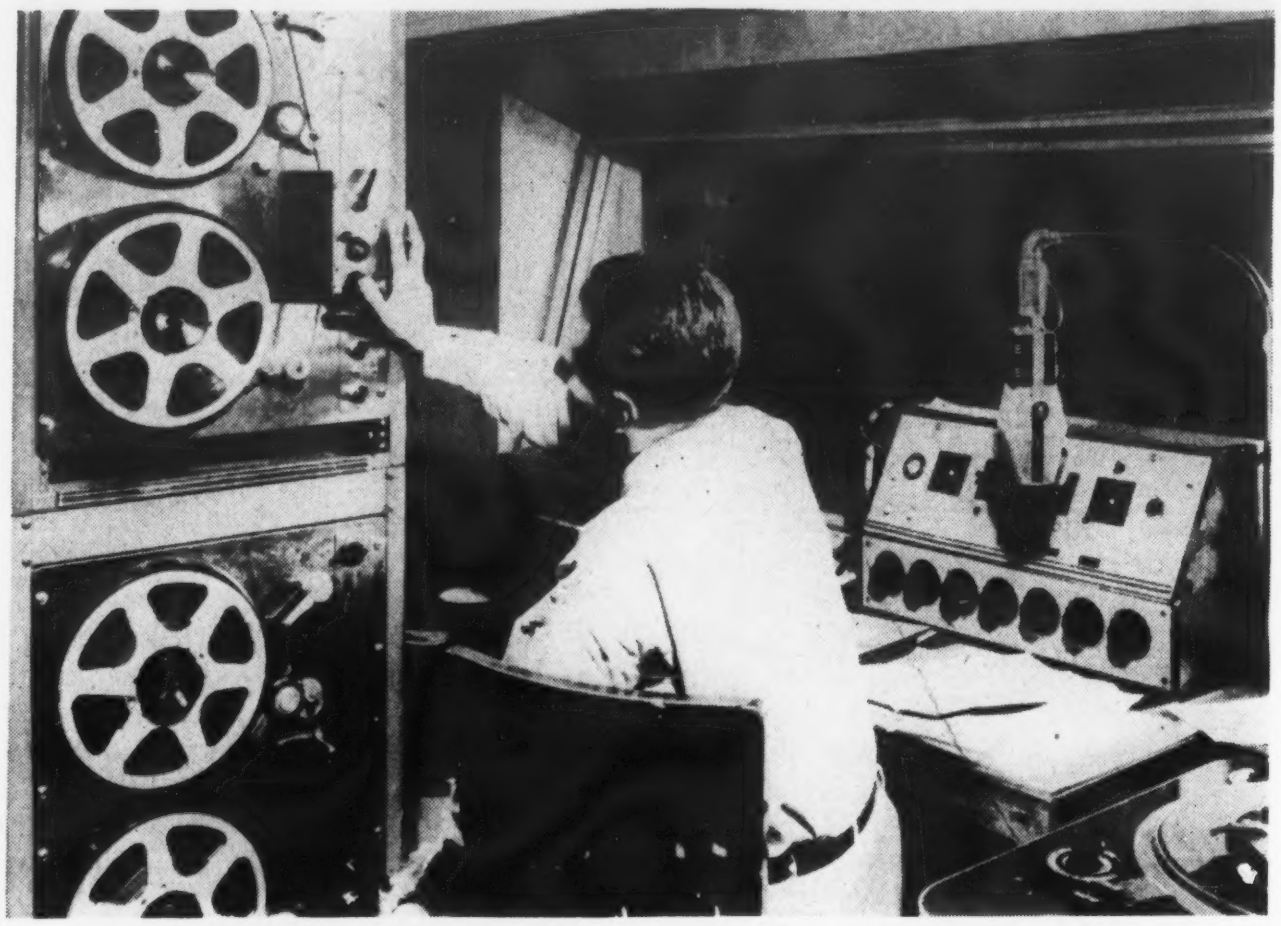
He arranged a series of demonstrations by manufacturers of the then "new" magnetic recording machines. When Ampex engineers managed to have an "audition" scheduled for their machine, they began a last minute night-and-day flurry of activity to have it completed on time. The last drop of solder went into place the day before the machine's scheduled appearance. It was put into the back seat of an automobile and driven the 400 miles from San Carlos, where Ampex was then located, to Los Angeles, arriving just before the demonstration was to begin.

On hearing the Ampex, Crosby placed an order for the first 20 Ampexes at $4,000 each. These machines were later sold to ABC and Bing Crosby Enterprises has been an important Ampex distributor ever since.

Soon recording engineers began to realize that magnetic recording was inherently closer to perfection than disc recording. Frequency response was not limited by the inertia of mechanical parts. Dynamic range was not limited by the dimensions of the groove on a disc. Mechanical noises from worn record surfaces and needle scratch were eliminated. Tapes could be replayed thousands of times without wear.

From that beginning, Ampex recorders are now used by every major radio network, by all major recording companies, by the Armed Forces Radio Service—by critical users of recorded sound in every category.

With this mushrooming use of magnetic tape recorders, Ampex itself has undergone vast growth. When the original machine was built in 1948, the company had eight employees housed in a small building in San Carlos, California. With over 60,000 square feet of space, the present plant in Redwood City, California, houses 500 workers.



Installation of Ampex recorders at Radio Station KGMB, Honolulu.

Such growth naturally requires considerable capital. Fortunately, Ayala Associates, a San Francisco investment firm, became actively interested in the company during its early development. Two of the managing partners of Ayala joined Ampex, bringing with them a considerable store of management knowledge. They are T. Kevin Mallen, chairman of the Ampex board, and George I. Long, executive vice president and general manager. Mr. Poniatoff, founder of Ampex, holds the office of president.

In theory a tape recorder is a simple device. It consists of a set of electro-magnets, known as heads; a mechanism for moving the magnetic tape past the heads, and electronic amplifiers to convert the output of microphones into a form suitable for recording or to amplify the output of the heads into a strength great enough to drive loudspeakers.

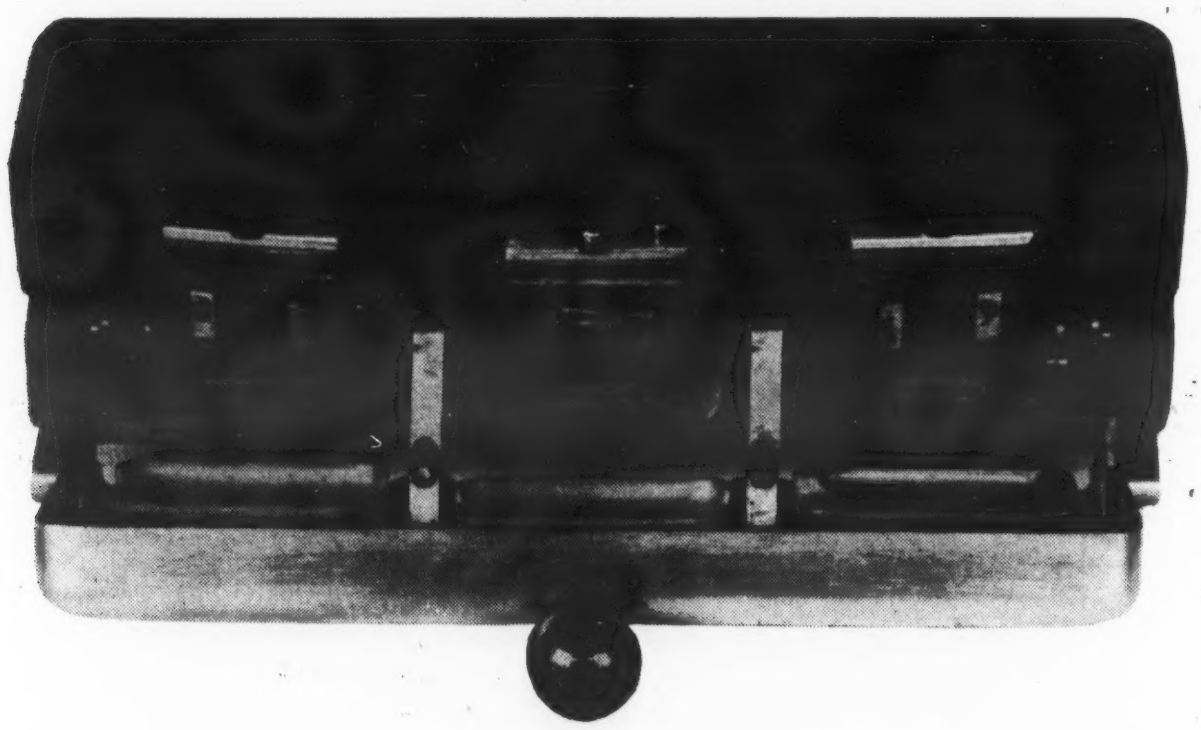
In practice, building a recorder is a complicated task requiring extremely precise manufacturing procedures. There are three heads in a set. In recording, the erase head cleans any old recording from the tape. The record head puts a new signal on the tape by magnetizing the active material coated in the plastic tape surface. In playing back, the magnetic pattern on the tape coating induces a current in the playback head.

Design and construction of these heads is extremely critical. Their surfaces are lapped to finishes so smooth that variations are measured in wave lengths of light. The entire magnetic action takes place in the air gap between the two pole pieces of the head. For uniform performance throughout the life of a head, the air gap must remain of constant width despite wear from the tape, which is more or less abrasive. In playback heads the gap is .00025 inches, which gives an indication of the precision required in building the heads.

Similarly, the tape transport mechanism must be a precision assembly. Motion of the tape past the heads must be at an absolutely uniform rate of speed. Otherwise extraneous frequencies, known as "flutter" and "wow" will be introduced into the recorded results. This phenomenon is best exemplified by the effect given when a warped phonograph record is played.

Electronic amplifiers associated with a tape recorder must introduce no extraneous noise in the form of hiss or hum. Reproduction must be so accurate that recorded sounds are perfect duplicates of the original

Typical Ampex magnetic head assembly, showing, from left to right, erase head, record head and playback head.



sounds—"high fidelity," if the words are used in their true sense.

Not long after the first Ampex sound recorders were placed in use, it became apparent that, if the frequency range of the machine were extended somewhat, they would be useful for recording many types of information other than sound. From this concept has grown an entirely separate field of application for Ampex recorders.

Sound recorders must handle frequencies roughly between 30 and 15,000 cycles per second. If the lower end of the spectrum were extended to 0 cycles (DC) many additional types of information, such as the mechanical vibrations of heavy machinery and the shock waves encountered in geophysical exploration, could be handled. If the upper end of the spectrum could be extended to 100,000 cycles per second, or even higher, other types of information, such as those encountered in information automatically relayed by radio from experimental aircraft, could be recorded.

Ampex engineers went to work and developed such machines. Today, in addition to sound recorders, the company builds machines capable of recording information from DC to 100,000 cycles or of recording information in pulse-width form.

Alert scientists and engineers soon discovered that information recorded on magnetic tape had many advantages over information recorded in any other way.

First, any physical phenomenon that can be converted into electrical signals within the frequency range of the recorder can be recorded. This immediately broadens the scope of information that can be recorded, since the frequency range of the magnetic recorder far exceeds those of other recording methods. This means that information beyond the scope of a pen recorder, for instance, can be recorded on magnetic tape. On playback of the tape, the machine can be slowed down so that the information can be recorded on a pen recorder if visual presentation is necessary.

Second, information is presented on playback as a duplicate of the electrical patterns available at the time of the original recording. Thus, tapes recorded at a proving ground in California, or even easily made duplicate tapes, can be mailed to a laboratory in New Jersey for analysis. Test results are available to the scientists just as though they had been present at the time of the actual test. Or, the movements of a machinist in Pennsylvania can be recorded and sent to an Arizona factory where the

Alexander M. Poniatoff, founder and president, The Ampex Corporation.

tape can "tell" a milling machine how to make parts that are exact duplicates of those made by the machinist thousands of miles away. Laboratory data can be fed directly into computers or automatic data reduction mechanisms, eliminating hours of tedious visual analysis.

Third, information recorded on magnetic tape is available for immediate playback without processing. There is no time delay or expense such as involved in photographic development.

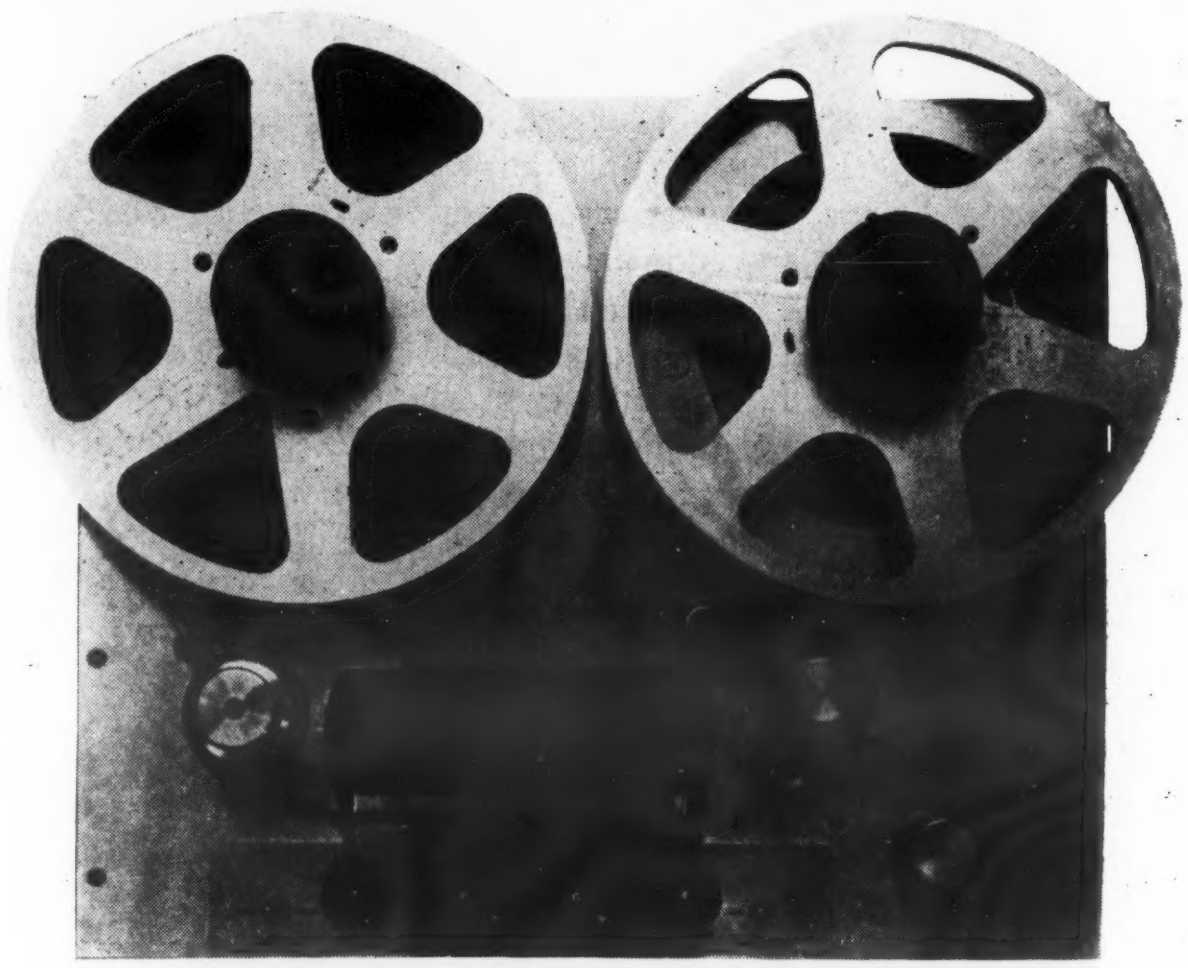
Fourth, since the medium is reusable, its cost is low.

Fifth, information recorded on magnetic tape is easily edited. Important information can be spliced together and unessential elements eliminated from a recording. This important information can, if desired, be made into a loop which will continuously repeat the information so that an engineer can introduce varying external factors until the desired result is achieved.

Recently the motion picture industry in its continuous technological efforts to improve the quality of the Hollywood product adopted magnetic sound methods for both studio recording and theater reproduction. Perhaps best known of the processes using magnetic sound is CinemaScope in which four separate magnetic sound tracks are recorded on the same film as the picture to provide stereophonic sound.

With the advent of CinemaScope, Ampex turned its experience in the field of magnetic sound recording to the cinema. Within two months after the decision was made, Ampex engineers had built and delivered a CinemaScope sound system to the Century theater in Buffalo. Acceptance of the Ampex system was immediate—so much so that in the New York City area alone 45 theaters inaugurated new CinemaScope sound systems built by Ampex during the 1953 Christmas holidays.

With the growing interest in quality sound recording, the increasing tendency toward automation in industry and the daily discovery of new uses for information recorded on magnetic tape, it's little wonder that Ampex executives face the future with confidence.



Tape transport mechanism on latest Ampex studio unit.

From the President

In his first message to the Association as its new national president, George Bailey urges all members to invite their friends and associates to join and participate in the AFCA's important program for the coming year.

Have you recently read over the objectives of our Association? Here they are:

> "The Association endeavors to maintain and improve the cooperation between the Armed Forces and Industry in the design, production, maintenance, and operation of communications, electronic, and photographic equipment, in time of peace as well as in time of war, and to preserve and foster the spirit of fellowship among former, present, and future service and industrial personnel in this field."

If you were among those attending the National Convention in Washington in May, you witnessed a fine example of the attainment of those objectives. If you could not attend, you will be especially interested in the full report which appears in this issue.

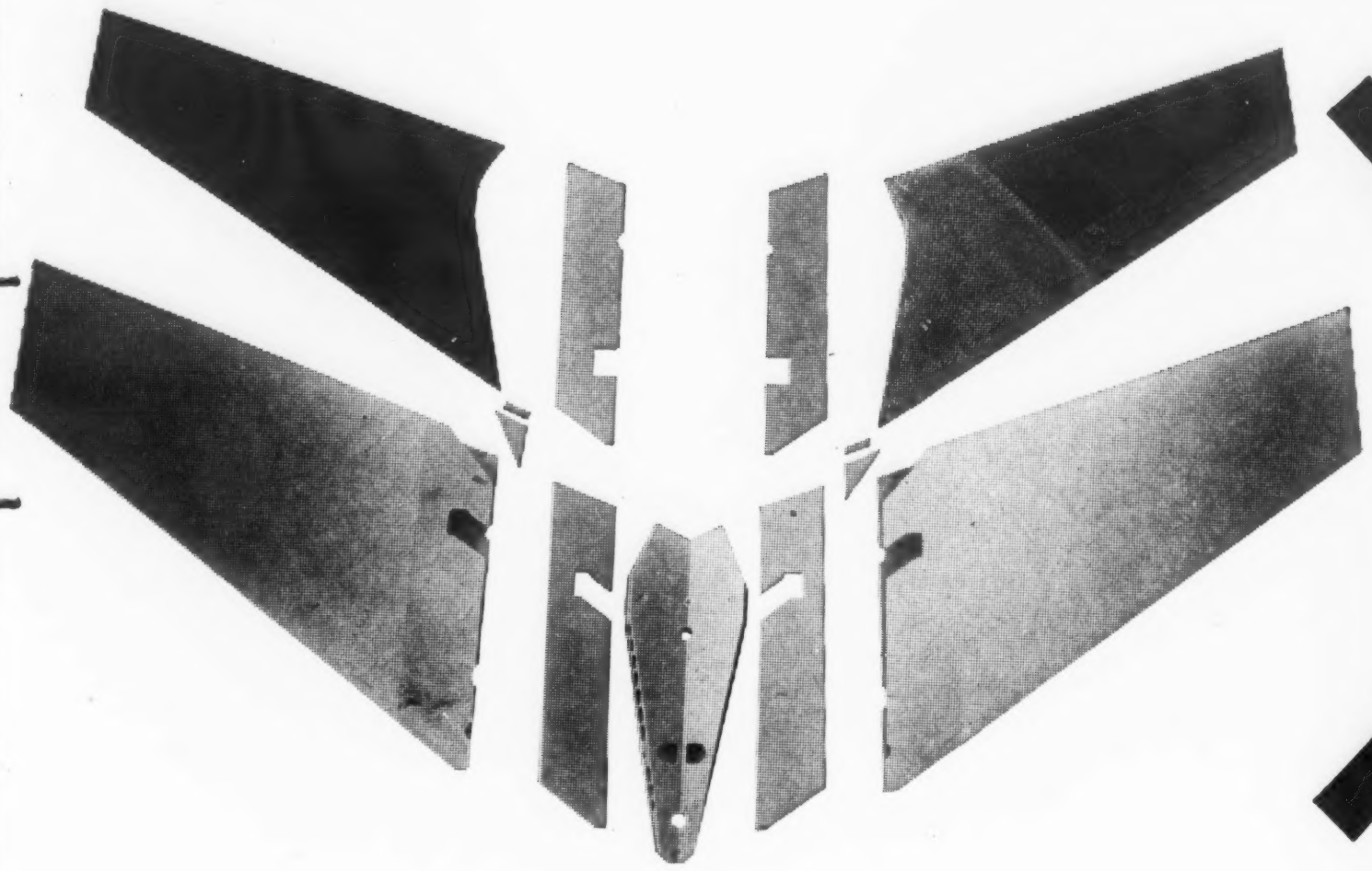
At the May meeting of the New York Chapter, it was announced that the chapter membership had passed the 1,100 mark. This demonstrates the progress which can be made by an energetic membership committee, assisted by enthusiastic and cooperative members in bringing to the attention of their friends the objectives of our Association and the service which individuals and organizations can render to our country by becoming members.

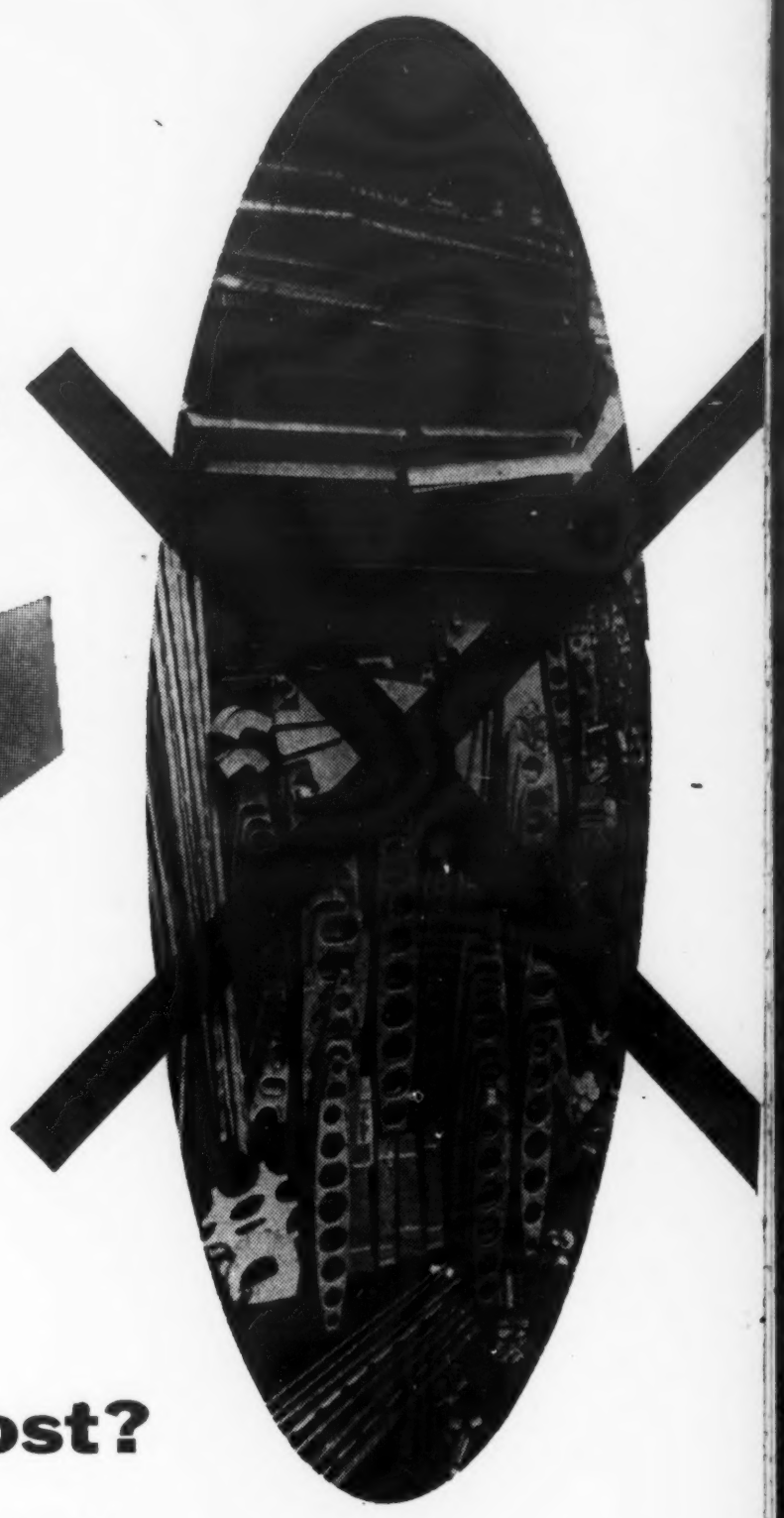
I also attended a recent meeting of the Fort Monmouth Chapter, which has a large and vigorous membership, winning the Chapter of the Year certificate for the largest number of new members.

At both these meetings, the "spirit of fellowship" between service and industrial members was encouragingly evident.

Although June 6 marked the tenth anniversary of "D-Day," the need for national defense is still urgent. Our Association offers us all the opportunity to contribute to our country's security by furthering the cooperation between the Armed Forces and Industry. Let us all invite our friends to join with us, as group members or as individuals, and thereby participate actively in this vitally important program.

George W. Bailey





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The stabilizer of the Matador consists of 13 parts. Shown beside it are some of the more than 3,000 parts which would be required to produce the stabilizer for a multi-engine transport by traditional methods.

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Association Affairs

Col. T. L. Bartlett New Regional Advisor

Col. Theodore L. Bartlett of RCA has been appointed to the AFCA Regional Advisory Committee to represent Region A which covers the New England States, New York and New Jersey. The chapters in this region, at the present time, are Boston, Cayuga, Fort Monmouth, New York, Rochester and Southern Connecticut.

A national director of the association, Col. Bartlett has long been active in AFCA affairs. In addition, having served as 1952 president of the New York Chapter, he is thoroughly familiar with all phases of chapter operation and activity and is in a position to be of considerable assistance to the chapters in Region A. His present plans are to visit each of these chapters at least once during the year.

AFCA Group Members Elected to RTCA

Two group members of the Armed Forces Communications Association have been elected to membership in the Radio Technical Commission for Aeronautics.

One of the new members is Stanford Research Institute, of Stanford, California. which, through its Radio Systems Laboratory, conducts research on navigation systems, airborne communications systems, and antennas. Phebco, Inc., of Baltimore, Maryland, also newly elected, is a supplier of aeronautical telecommunication equipment.

All members of the RTCA are actively engaged in some phase of aeronautical telecommunication. The Commission, located in Washington, D. C., was organized in 1935 to coordinate governmental and industrial development of airborne radio.

ROTC AWARDS

AFCA Honor Awards for the 1953-54 academic year were presented to 145 outstanding senior ROTC, NROTC and AFROTC students majoring in electrical engineering. In addition to the gold medal, each winner received a special certificate and a year's membership in the association.

The names of the winners will be reported in the September-October issue of SIGNAL.

SERVICE ACADEMY AWARDS

The association's awards at the Military and Naval Academies this year were donated by the Admiral Corporation and consisted of three-way portable radios complete with batteries and leather carrying case.

AFCA President George W. Bailey made the presentation at West Point to Donald Fred Newnham of Johnstown, N. Y., the graduating cadet having the highest rating in the study of electricity.

The award at Annapolis went to George Burton Parks of San Francisco, as the graduating midshipman having the highest standing in the electronics course. Rear Adm. Joseph R. Redman, past president of the association, made the presentation.

SIGNAL CONTRIBUTING EDITOR JOINS AUTOMATIC ELECTRIC

Automatic Electric Company of Chicago has recently announced the appointment of Bruce Quisenberry, formerly Chief of the Office of Technical Liaison, Office of the Chief Signal Officer and a Contributing Editor of SIGNAL, as assistant director of publicity.

In his new position, Mr. Quisenberry will undertake various assignments relating to publicity as well as public and personnel relations.

He joins Automatic Electric with a background of varied experience in public relations and communications work, much of it acquired during 12 years of association with the Signal Corps.

During World War II Mr. Quisenberry was appointed a special assistant to the Director of Military and Civilian Personnel at the Signal Corps Training Center at Fort Monmouth.

After his discharge from the Army, with the rank of major, Mr. Quisenberry was named to his former position as Chief of the Office of Technical Liaison at Signal Corps headquarters in the Pentagon. The effectiveness of his services in this capacity is attested by a Department of the Army citation for meritorious civilian service, which he received upon terminating his association with the Signal Corps.

GEN. C. O. BICKELHAUPT DIES

Former AFCA Vice President and Director

Brig. Gen. Carroll O. Bickelhaupt, a leader in the communications field for many years and a former Vice President and Director of the Armed Forces Communications Association, died recently in Rochester, New York.

An authority on communications matters, General Bickelhaupt was a former Vice President and Secretary of the American Telephone and Telegraph Company. His retirement from A.T. & T. in 1952 ended forty-one years of service with the Bell System.

In 1916 he was commissioned a lieutenant in the Signal Corps Reserve, serving in France during World War I and rising to the rank of Lt. Colonel in 1919. Recalled to active duty in 1941, he served as Director of the Communications Division in the Office of the Chief Signal Officer, and later at Fort Monmouth as Brig. General in command of the Signal Training Center.

Between the wars, Gen. Bickelhaupt was advanced steadily by A. T. & T. He was made an assistant Vice President in 1930 and promoted to Vice President in 1941. Four years later he became Secretary of the company.

Gen. Bickelhaupt was one of the founders of the Armed Forces Communications Association, having been a Director and President of the New York Chapter of the Army Signal Association and later a Director and Vice President of the AFCA.

Brig. Gen. Carroll O. Bickelhaupt.

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ARMED FORCES COMMUNICATIONS ASSOCIATION

(COMMUNICATIONS—ELECTRONICS—PHOTOGRAPHY)

1624 Eye Street, N.W.
Washington 6, D. C.

CONSTITUTION and BY-LAWS

Adopted April 29, 1947

Revised

May 11, 1948—March 28, 1949—May 12, 1950—April 19, 1951—April 24, 1952
May 15, 1953—May 7, 1954

For the information of our members there is published here our Association's Constitution and By-Laws to include latest revisions made at the 1954 Annual Meeting, May 7 at Washington, D. C.

PREAMBLE

The Armed Forces Communications Association, organized in 1946 and incorporated under the laws of the District of Columbia, is a national society of American citizens working toward national security in the fields of communications, electronics and photography.

The Association endeavors to maintain and improve the cooperation between the Armed Forces and Industry in communications, and in the design, production, maintenance and operation of communications, electronics and photographic equipment in time of peace as well as in time of war.

The principal objective of the Association is an active membership of American citizens to whom the responsibility of training, production, maintenance and operation of this type of equipment falls in time of peace as well as in time of war.

The Association is entirely patriotic and non-sectarian; it has no commercial interests and no political alliances. It is not operated for profit and its income is expended in furthering its aims and purposes. Its elected officers serve without remuneration. All American citizens are eligible to membership.

SIGNAL, the journal of the Association, is published for the purpose of disseminating chapter news and other information of interest and importance to the members.

ARTICLE I

NAME AND LOCATION

Sec. 1. The name of the Association shall be the Armed Forces Communications Association.

Sec. 2. The executive offices of the Association shall be in the City of Washington, District of Columbia.

ARTICLE II

MEMBERSHIP

Sec. 1. Membership in the Association shall be open to American industrial organizations and to all men and women who are American citizens and who are interested in furthering the objectives of the Association, with honorary and associate memberships offered to certain citizens of foreign countries.

ARTICLE III

GOVERNMENT AND OFFICERS

Sec. 1. The government of the Association shall be vested in the Board of Directors, which may exercise all powers and do all such things as may be exercised or done by the Association, but subject, nevertheless, to the provisions of the statutes of the District of Columbia, the Certificate of Incorporation of the Association, and the Constitution and By-laws of the Association.

Sec. 2. The Board of Directors shall consist of 32 members, elected by the Council, each to serve without pay for a term of four years, and divided into four classes of eight members each, one class to retire at the end of the annual meeting each year, or upon the election and qualification of their successors. The Board of Directors shall have the power to fill casual vacancies in its membership and in all national offices of the Association, and to initiate executive measures necessary to achieve the objectives of the Association. The Board shall meet at least once each year, at the same time and place as the annual convention of the Association.

Sec. 3. The officers shall consist of a president, an executive vice president, a first vice president, a second vice president, and such additional number of vice presidents, not to exceed three, as may be authorized by the Board of Directors, a secretary, and a treasurer. With the exception of the executive vice president, secretary, and treasurer, the officers shall serve without pay. All officers (with the exception of the Executive Vice President, the Secretary, and the Treasurer) shall be elected by the Board of Directors at its annual meeting, from the active membership of the Board, to take office at the end of the annual meeting at which they are elected, and to serve for a term of one year following their election, or until their successors are elected and qualify.

Sec. 4. The Board of Directors shall at its annual meeting elect a Counsel to serve without pay for a term of one year beginning at the end of the meeting at which he is elected, or until his successor is elected and qualifies.

Sec. 5. The Board of Directors shall at its annual meeting appoint an Executive Vice President, a Secretary, and a Treasurer, each to serve for a term of one year beginning at the end of the meeting at which he is appointed, or until his successor is appointed and qualifies, and shall fix the annual salary for such period. The offices of Executive Vice President, Secretary and Treasurer may be held by one person, who need not be a director of the Association.

Sec. 6. Regular Service personnel shall not be eligible to hold a paid national office in the Association while on active duty status.

Sec. 7. The Council of the Association shall consist of the members of the Board of Directors and one representative for each 100 members or fraction thereof in each chapter, provided however that no chapter shall have less than two chapter representatives, elected or appointed by the chapter for a period of one year beginning on April 1st of each year. The national president of the Association, or in his absence the senior vice president present, shall serve as Council chairman.

The functions of the Council shall be to elect the Board of Directors and Honorary Members, and to make recommendations with reference to any proposed amendments to the Constitution. Chapters shall have power to fill unexpired terms of their Council representatives. The Council shall meet once each year at the time and place of the annual convention of the Association and at the hour designated by the Executive Committee.

Any chapter, by an instrument in writing filed with the Secretary of the Association, may authorize its representative or representatives present at a meeting of the Council to cast the vote or votes of any of its representatives who may be absent. A majority of the Council votes cast shall be necessary for election to the Board of Directors. Members of the Council are eligible to be present at the annual meeting of the Board of Directors and to participate in the discussions, but shall not have the power to vote.

Sec. 8. There shall be an Executive Committee which shall consist of the President, the immediate Past President, and seven other members of the Board, to be elected by the Board of Directors at its annual meeting for a term of one year beginning at the end of the annual meeting at which they are elected. The Counsel and Executive Vice President shall be eligible to attend meetings of the Committee, but shall have no vote unless they have been elected members of the Executive Committee.

The Executive Committee shall meet at least once each quarter, and at the call of the President or of any three of its members. It shall exercise the powers set forth in the Constitution and By-Laws, also the powers of the Board of Directors between meetings of that Board. All actions taken by the Executive Committee shall be ratified by the Board of Directors at its next subsequent meeting. The Executive Committee shall have the power to fill vacancies for unexpired terms. Notice in writing of the time and place of each meeting of the Executive Committee shall be sent to all members of the Committee at least ten (10) days prior to the meeting date.

Sec. 9. Special meetings of the Board of Directors may be called by the President, the Executive Committee, or any three members of the Board of Directors. Notices of such meetings shall be in writing and shall state the time and place of the meeting, and shall be sent to all Directors at least ten (10) days prior to the meeting date.

Sec. 10. Qualification of Directors and others shall be by acceptance within thirty (30) days by the Director or other persons elected or appointed.

Sec. 11. A quorum of the Council shall consist of 11 members; of the Board of Directors, 9 members; and of the Executive Committee, 3 members.

ARTICLE IV

MEETINGS

Sec. 1. The Association shall hold an annual meeting in the spring of the year at a time and place to be designated by the Executive Committee, which will cause to be prepared a program to include, where possible, the demonstration of such military and industrial communications, electronic and photographic equipment and training as may be authorized.

Sec. 2. The Association may hold such special meetings as may be called by the President or the Board of Directors or the Executive Committee.

ARTICLE V

CORPORATE OBLIGATIONS

Sec. 1. No obligation shall be incurred on behalf of the Association except by the Executive Vice President or by his written authorization and then only to the extent of funds in the Treasury available to meet the obligation. All obligations incurred by the Corporation shall be solely corporate obligations and no personal liability whatsoever shall attach to, or be incurred by, any member, officer or director of the Corporation by reason of any such corporate obligation.

ARTICLE VI

AMENDMENTS

Sec. 1. Amendments to this Constitution may be proposed by a majority vote of the Board of Directors or of the Executive Committee or upon petition addressed to the President and signed by not less than five percent of the total number of full members.

Sec. 2. Proposed amendments shall be submitted to the Council at any annual or special meeting for discussion and recommendations after which they shall be referred for final action to the Board of Directors, which may adopt them by a majority vote of the Directors present at any duly convened annual or special meeting at which a quorum is present.

BY-LAWS

1. AIMS AND PURPOSES

a. To preserve and foster the spirit of fellowship among former, present and future communications, electronics and photography personnel of Industry and the Armed Forces.

b. To commemorate the services rendered by the communication, electronic and photographic industries and of industrial personnel, and by the military personnel assigned to these activities in the wars in which the United States has been or may become engaged.

c. To promote efficiency in military communications, electronics and photography, especially through better liaison between Industry and the Armed Forces, as well as among the three Services themselves. This will include the maintenance of close relations between civilian scientists, engineers, manufacturers and operating companies and those concerned with similar activities in military, naval and air force communications, electronics and photography.

d. To bring to the attention of the membership through chapter meetings and the Association magazine, the importance of thorough cooperation between Industry and the Armed Forces in the communications, electronics and photographic fields.

e. To encourage adequate military training throughout the Nation, the upbuilding of adequate enlisted, and commissioned National Guard and Reserve forces, and effective industrial preparedness for war, in the fields of communications, electronics and photography.

2. CLASSES OF MEMBERSHIP

a. FULL MEMBERSHIP in the Association shall be open to all American citizens interested in advancing the aims of the Association—especially in communication, electronic and photographic phases thereof. Present and former military personnel and civilians employed in the electronic, photographic and communication industries, will be especially encouraged to become full members.

b. LIFE MEMBERSHIP in the Association shall be open to all men and women who are American citizens and who are interested in promoting the objectives of the Association. Life membership shall continue during the lifetime of the life member and shall expire at his death. It shall not be transferable.

c. STUDENT MEMBERSHIP in the Association shall be open to all men and women who are American citizens and who are students in the service academies and schools, and in civilian colleges and universities.

d. GROUP MEMBERSHIP in the Association shall be open to all firms and companies controlled by American citizens who are interested in promoting the cause of industrial preparedness particularly in connection with communications, electronics and photography, and with research, development, production, manufacture, operation, and supply of communication, electronic and photographic equipment. Group members shall have the privilege of naming ten of their employees or officials who are Ameri-

can citizens for full membership in the Association, and members thus named shall pay no individual dues.

e. HONORARY MEMBERSHIP in the Association may be proposed by at least three full or life members of the Association and a favorable vote by a majority of the Council voting shall be necessary for election.

Honorary Life membership shall be extended to all former Chief Signal Officers of the Army and Directors of Naval, Air, and Coast Guard Communications, and the Defense Department Directors of Communications, and shall be extended to the active officers in these positions as soon as they assume office.

Honorary membership shall be extended to the Chairman of the Joint Chiefs of Staff and to the Chiefs of Staff of the several Services during their tenure of office, and to such other public officials as the Executive Committee may direct.

Honorary members shall be entitled to all privileges of full membership except as otherwise provided in the Constitution and in these By-laws.

f. FOREIGN ASSOCIATE MEMBERSHIP in the Association shall be open to all men and women who are citizens of those foreign countries where there are officially chartered chapters of the AFCA and who are recommended by any such local chapter, and to all men and women in the military services of foreign countries who are assigned with, or attached to, any organization, unit or school of the Armed Forces of the United States for duty, liaison, or training. They shall pay the same dues as full members of the Association, and shall be entitled to all privileges of full membership except the right to vote or to hold office, or to attend meetings at which classified information is to be discussed or classified material displayed.

3. MEMBERSHIP INFORMATION—GENERAL

a. The term "members" except where specifically stated otherwise in the Constitution and in these By-laws shall mean full and life members only. Only these may vote or hold office.

b. The election to membership of all classes shall be by action of the Executive Committee, and the decision of that Committee as to eligibility shall be final.

c. Any person desiring to become a member shall make written application to the Executive Vice President. Said application shall be in such form and contain such data as may be prescribed by the Executive Vice President or the Membership Committee, in either case subject to the subsequent approval by the Executive Committee.

d. Any member may withdraw from the Association at any time by tendering his resignation in writing, but such resignation shall not become effective until said member shall have paid all obligations due the Association from him at the time of such resignation.

e. Any member may be dropped for cause by the vote of three members of the Executive Committee or, having been dropped, may be reinstated at the discretion of the Executive Committee.

f. All members are entitled to receive one copy each of the Association publications.

4. MEMBERSHIP DUES

a. The fee for *life membership* in the association shall be fifty dollars ($50.00).
For *full members*, five dollars ($5.00).
For *student members*, two dollars and fifty cents ($2.50).
For *foreign associate members*, five dollars ($5.00).
For *group members*, two hundred dollars ($200.00), except for small business firms (with 500 or fewer employees) for which the annual dues are one hundred dollars ($100.00).

5. OFFICERS

a. The President shall have general supervision of the affairs of the Association and shall perform the duties usual to his office. He shall preside at the meetings of the Council, of the Board of Directors, and of the Executive Committee. He shall be *ex officio* a member of all committees and of all subcommittees thereof. In the absence of the President his duties shall devolve upon the Vice Presidents in order of seniority.

b. The First Vice President shall have general charge of memberships and the activities of local chapters.

c. The Second Vice President shall have general charge of the activities of the National Advisory Committees.

d. The Counsel shall be the legal advisor to the Executive Vice President, the National Officers, the Executive Committee, and the Board of Directors.

e. The Treasurer shall be the custodian of the funds of the Association under the direction of the Executive Committee. He shall render an annual report and such special reports as may be called for by the Executive Committee. The accounts of the Association shall be audited annually by independent auditors. However, in the discretion of the Executive Committee, a certified public accountant designated by it may conduct the annual audit, his report to be made to the Executive Committee.

f. The Executive Vice President shall make collections and disbursements under the supervision of the Executive Committee; shall keep the roster of the members and the records of the status of annual dues; shall be the keeper of the seal of the Association; and shall have the custody of correspondence and records. He shall be responsible that suitable arrangements are made for the annual and other meetings of the Association, of the Council, of the Board of Directors, and of the Executive Committee, the proceedings of which he shall record. He shall submit an annual report to the Board of Directors at its annual meeting, and a quarterly report at the specified quarterly meetings of the Executive Committee. He shall be an *ex-officio* member of all national committees but without the right to vote.

The Executive Vice President shall be responsible for hiring and discharging the necessary National Headquarters personnel and for the management of the Executive Offices and shall have the power to contract in the name of the Association for such services and supplies as are necessary for its operation. He shall have administrative charge of the activities and national programs of the Association, of the Association's magazine SIGNAL, and of all other Association publications.

g. The Secretary shall render the Executive Vice President such assistance as he may require and under the direction of the Executive Vice President perform such other duties as appertain to his office.

6. FISCAL YEAR

a. The fiscal year shall close on March 31, 1951 and on March 31 of each year thereafter.

7. CHAPTERS

a. Upon petition stating that not less than twenty-five (25) members of the Association in any locality desire to form a local chapter for the more intimate achievement of the purposes of the Association, the Executive Vice President of the Association shall immediately authorize a meeting for such inauguration, and assist in every way possible toward the organization of such chapter.

b. Upon the formation of a new chapter, the Association will issue a suitable charter, signed by the National President and the Executive Vice President of the Association.

c. Every member of the Association, unless he desires otherwise, will automatically become a member of the local chapter of the territory in which he resides, but no person shall be a member of a local chapter who is not a member of the Association.

The local chapter may collect annually all dues, both original and renewal, for all of its individual and group members. The sum of $5.00 for each full member may be sent to National Headquarters, $1.00 of which will later be returned to the chapter. Or the sum of $1.00 may be withheld by the chapter for each full member and the remaining $4.00 remitted with the application form submitted by the member.

The annual group membership fee of $200.00 ($100.00 in case of small business), either original or renewal, shall be remitted to National Headquarters, and $50.00 ($10.00 in the case of small business) shall be distributed quarterly by National Headquarters to chapters, on a pro rata basis of paid membership at the end of the quarter previous to that in which the payment is made.

d. The constitution and by-laws of each local chapter shall be in the general form of that of the Association and shall be submitted to the Executive Vice President of the Association for review and shall be approved by him before becoming effective.

e. It shall be the general purpose of the chapters of the Association to bring their individual and group members into a closer fellowship with each other and with the communication, electronic and photographic personnel of the Armed Services. This can be accomplished through the medium of chapter meetings, visits to military establishments, industrial plants and laboratories, and through seminars and discussions consistent with the national policies and objectives of the Association.

f. Sub-chapters or posts may be organized by chapters of the Association. Such sub-chapters or posts will be chartered by the parent chapter with an initial membership of at least five members of the Association in good standing. All applications and dues of such members will continue to be handled by the National Headquarters.

g. Student chapters may be organized at any college or university in the United States which carries electronics or communications courses in its curriculum.

A minimum of 10 student members may file petition for a student chapter. This charter will be issued by National Headquarters in accordance with Sec. b of this By-law.

8. RESTRICTIONS

a. No member of the military establishment of the Army, Navy, Air Force, or Coast Guard shall be employed by the Association in a paid capacity, except that articles written for publication may be paid for with the approval of the Executive Vice President.

9. NOMINATIONS AND ELECTIONS

a. On or before March 1st each year the President shall appoint a nominating committee, composed of not less than three nor more than five members of the Association. This committee shall draw up a slate of nominations for members of the Board of Directors to fill the vacancies which will occur in that year. On or about March 1st the Executive Vice President shall notify all Directors and Council representatives that nominations for new Directors are in order and shall request that the Council members submit to the chairman of the nominating committee such names as they desire to nominate for the Director vacancies to be filled.

Any group of twenty or more members in good standing of the Association may submit to the chairman of the nominating committee the name of a candidate or list of candidates, for membership on the Board of Directors. Such a petition shall be in the hands of the nominating committee at least four weeks before the annual meeting. If any person or persons so proposed is not included by the nominating committee in its list of nominations, then any member of that group proposing such person or persons may place his or their names in nomination before the Council at the same time as the names of those nominated by the nominating committee. No other person shall be voted upon or elegible for election as a director. Those candidates receiving the highest number of votes shall be declared elected.

After the nominees are selected and after ascertaining if the proposed candidates will accept the posts indicated, the chairman of the nominating committee will submit the list of candidates for directors, at the annual meeting of the Council for appropriate action.

The officers of the Association will then be elected by the Board of Directors at their annual meeting. A majority of the Directors present shall be necessary for the election of any officers or member of the Executive Committee.

10. AMENDMENTS

a. The Board of Directors shall have the power to adopt and amend the By-laws by a majority vote of those present at any annual or special meeting of the Board at which a quorum is present.

11. INSIGNIA

a. The insignia or emblem of the Association shall consist of:

1. The central figure is an alert powerful American eagle with strong talons clutching lightning flashes—symbolic of a strong America insofar as national defense and especially modern communications are concerned—our basic reason for existence. The border consists of leaves of the olive branch of peace showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—the first means of signaling in the U. S. Signal Corps and a method still used for special purposes by the Navy. Just above the eagle and between his outstretched wings, is a heavy bomber in flight, symbolizing the complicated and essential communication in the Air Force, Marine and Naval aviation, both intra- and inter-aircraft, air-ground and on the ground. Above that is a radar antenna array and at the very top a radio relay antenna—for the latest major step in military communications. In the color version there are the traditional colors of the signal flags—dexter white flag with red center and sinister red flag with white center —with a gold border to the whole.

2. Insignia in this form with ribbon and modifications of it in the form of pins, badges, buttons and rings, shall be authorized by the Board of Directors for use of members. The ribbon shall be of three stripes of equal width, of dark blue, orange, and light blue—total width to be 1⅜ inches.

b. The flag of the Association shall be the above insignia superimposed upon a field of sky blue cloth —representing the medium through which modern signals are transmitted. Under the insignia shall be a scroll on which shall be inscribed "National Security through Military Preparedness."

12. NATIONAL ADVISORY COMMITTEES

a. Members of the Association shall be eligible for membership on National Advisory Committees devoted primarily to the problems of the Armed Services and to the advancement of knowledge, engineering practices and production and design techniques relating to the special fields of communications, electronics or photography and to activities of the Association.

b. These committees shall be organized in conformity with conditions in each particular field rather than according to any standard pattern.

c. Each committee shall have a chairman selected by the President of the Association and approved by the Executive Committee. The other members shall be designated by the chairman. Through meetings, conferences and discussions and in cooperation with local chapters, they shall keep the membership in close contact with progress and developments in their specific fields. They shall meet as committees from time to time to initiate recommendations or reports and shall be available in an advisory capacity on such matters as may be presented for their study and report by the Armed Forces or the Association.

AFCA Group Members

Communications—Electronics—Photography

Listed below are the firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation.

Acme Telectronix
Admiral Corporation
Allied Control Co., Inc.
Allied Radio Corporation
Almo Radio Company
American Cable & Radio Corp.
American Institute of Electrical Engineers
American Machine & Foundry Co.
American Phenolic Corporation
American Radio Relay League
American Telephone & Telegraph Co.
Ampex Electric Company
Anaconda Wire & Cable Company
A. R. F. Products, Inc.
Argus Cameras, Inc.
Arnold Engineering Company
Atlas Precision Products Co.
Audio Products Corporation
Automatic Electric Company
Automatic Electric Sales Corp.
Baltimore News Post
Barry Corporation, The
Bell Telephone Company of Pa.
Bell Telephone Laboratories, Inc.
Bendix Radio
Berkshire Transformer Corp.
Bliley Electric Company
Breeze Corporations, Inc.
Burnell & Company
California Water & Telephone Co.
Cambridge Thermionic Corp.
Capehart-Farnsworth Co.
Capitol Radio Engineering Inst., Inc.
Cargo Packers Inc.
Carolina Telephone & Telegraph Co.
Central Technical Institute
Chesapeake & Potomac Tel. Co.
Churchill Cabinet Co.
Cincinnati & Suburban Bell Tel. Co.
Collins Radio Company
Columbus Process Co., Inc.
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Crosley Division-Avco Mfg. Corp.
Dana, P. A., Inc.
Designers for Industry, Inc.
De Vry Corporation
Diamond State Telephone Co.
Downing Crystal Company
Dukane Corporation
DuMont, Allen B., Laboratories, Inc.
Eastern Air Devices, Inc.
Eastman Kodak Company
Electronic Associates, Inc.
Elgin Metalformers Corporation
Espey Manufacturing Co., Inc.
Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.
General Aniline & Film Corp.
General Cable Corporation
General Communications Co.
General Electric Company
General Insulated Wire Works, Inc.
General Telephone Corp.
General Transformer Co.
Gilfillan Bros., Inc.
Globe Wireless, Ltd.
Gray Manufacturing Co.
Guardian Electric Mfg. Co.
Hallicrafters Company, The
Haloid Company
Hammarlund Manufacturing Co., The
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motor Corp.
Hitemp Wires, Inc.
Hoffman Laboratories Incorp.
Hopkins Engineering Co.
Hughes Aircraft Company
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Institute of Radio Engineers
International Business Machines
International Resistance Co.
International Tel. & Tel. Corp.
Jacobsen Manufacturing Co.
Jansky & Bailey, Inc.
Kellogg Switchboard & Supply Co.
Keystone Electronics Co.
Kleinschmidt Laboratories, Inc.
Lavoie Laboratories
Leich Sales Corporation
Lenz Electric Manufacturing Co.
Lewyt Corporation
Loral Electronics Corporation
Machlett Laboratories, Inc.
Magnavox Company
Majestic Radio & Television, Inc.
Mallory, P. R., & Co., Inc.
Merit Coil and Transformer Corp.
Michigan Bell Telephone Company
The Montgomery Company
Motorola, Inc.
Mountain States Tel. & Tel. Co.
Muter Company, The
National Company, Inc.
Nelson Technical Enterprises
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New London Instrument Co.
New York Telephone Company
Northwestern Bell Telephone Co.
Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Pacific Mercury Television Mfg. Corp.
Pacific Telephone & Telegraph Co.
Phebco, Inc.
Philco Corporation
Photographic Society of America
Pickering & Company, Inc.
Pioneer Electric & Research Co., The
Platt Electronics Corporation
Precision Apparatus Co., Inc.
Prodelin Inc.
Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Photophone, Ltd.
RCA Victor Division
Radio Frequency Laboratories, Inc.
Radio Receptor Company
Raymond Rosen Engineering Products, Inc.
Ray-O-Vac Company
Raytheon Manufacturing Company
Red Bank Division Bendix Aviation Corp.
Reeves Instrument Corp.
Remington Rand, Inc.
Remler Company, Ltd.
Robco Mfgr. Division Pilot International Corp.
Saxonburg Ceramics
Seeburg, J. B. Corporation
Simmon Brothers, Inc.
Society of Motion Picture & Television Engineers
Sonotone Corporation
Soundscriber Corp.
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sparton Radio-Television Division, Sparks-Withington Co.
Sperry Gyroscope Company
Sprague Electric Company
Stackpole Carbon Company
Standard Coil Products Co., Inc.
Standard Piezo Co.
Stanford Research Institute
Stewart-Warner Corporation
Stromberg-Carlson Co.
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.
Talco Engineering Co., Inc.
Technicolor Motion Picture Corp.
Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Texas Instruments, Inc.
Times Facsimile Corporation
Trad Television Corp.
Triad Transformer Corp.
Tung-Sol Lamp Works, Inc.
United States Rubber Company
United Telephone Co.
United Transformer Co.
Utah Radio Products Co., Inc.
Voltz Brothers, Inc.
Waterman Products Co., Inc.
West Coast Telephone Co.
Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Whitney Blake Co.
Wickes Engineering & Construction Co.
Wilcox Electric Co., Inc.
Willard Storage Battery Company
Wisconsin Telephone Company
Wollensak Optical Company
York-Hoover Corporation
Zenith Radio Corporation

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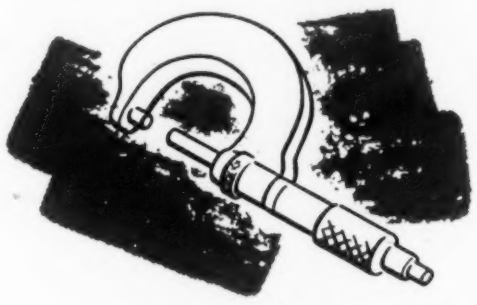

Physical dimensions and tolerances are checked at every key stage of manufacture by thoroughly trained Quality Control inspectors to insure shipment of a superior product.

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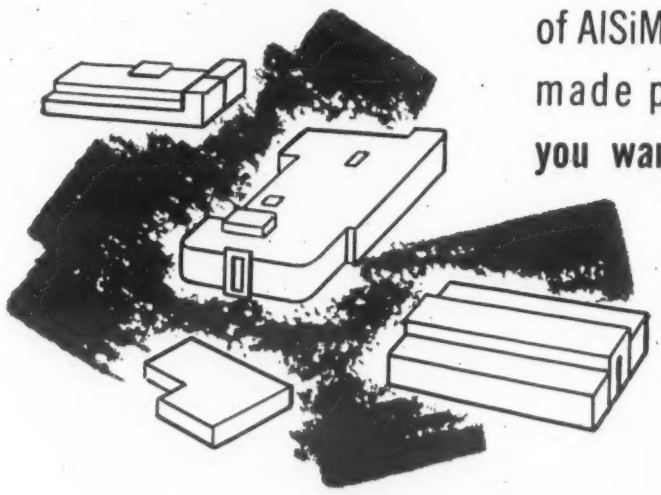

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AFCA CHAPTERS

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Region B: J. H. LaBrum, Packard Building, Philadelphia, Pa. *Delaware, Kentucky, Maryland, Ohio, Pennsylvania, West Virginia and Virginia.*

Region C: Ralph S. Grist, So. Bell T&T Co., Atlanta, Ga. *Southeastern States along Atlantic and Gulf coasts — from North Carolina to Louisiana including Tennessee.*

Region D: Col. Thos. F. Yates, 308 So. Akard St., Dallas, Texas. *New Mexico, Texas, Oklahoma, Arkansas.*

Region E: T. S. Gary, 1033 W. Van Buren St., Chicago, Ill. *Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Colorado.*

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SOUTHERN CONNECTICUT: President—Edgar L. Love, 175 Dessa Drive, Hamden, Conn. Secretary—James J. McKeon, Sound Scriber Corp., 146 Munson St., New Haven, Conn.

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NEW YORK UNIVERSITY, New York, N. Y. President—Cecil R. Frost. Secretary—Edward Abelowitz.

NORTHEASTERN UNIVERSITY, Boston, Mass. President—Fred Hersey. Secretary—Curtis N. Tholander.

NORWICH UNIVERSITY, Northfield, Vt. President—Wilbur Edel. Secretary—William Altman.

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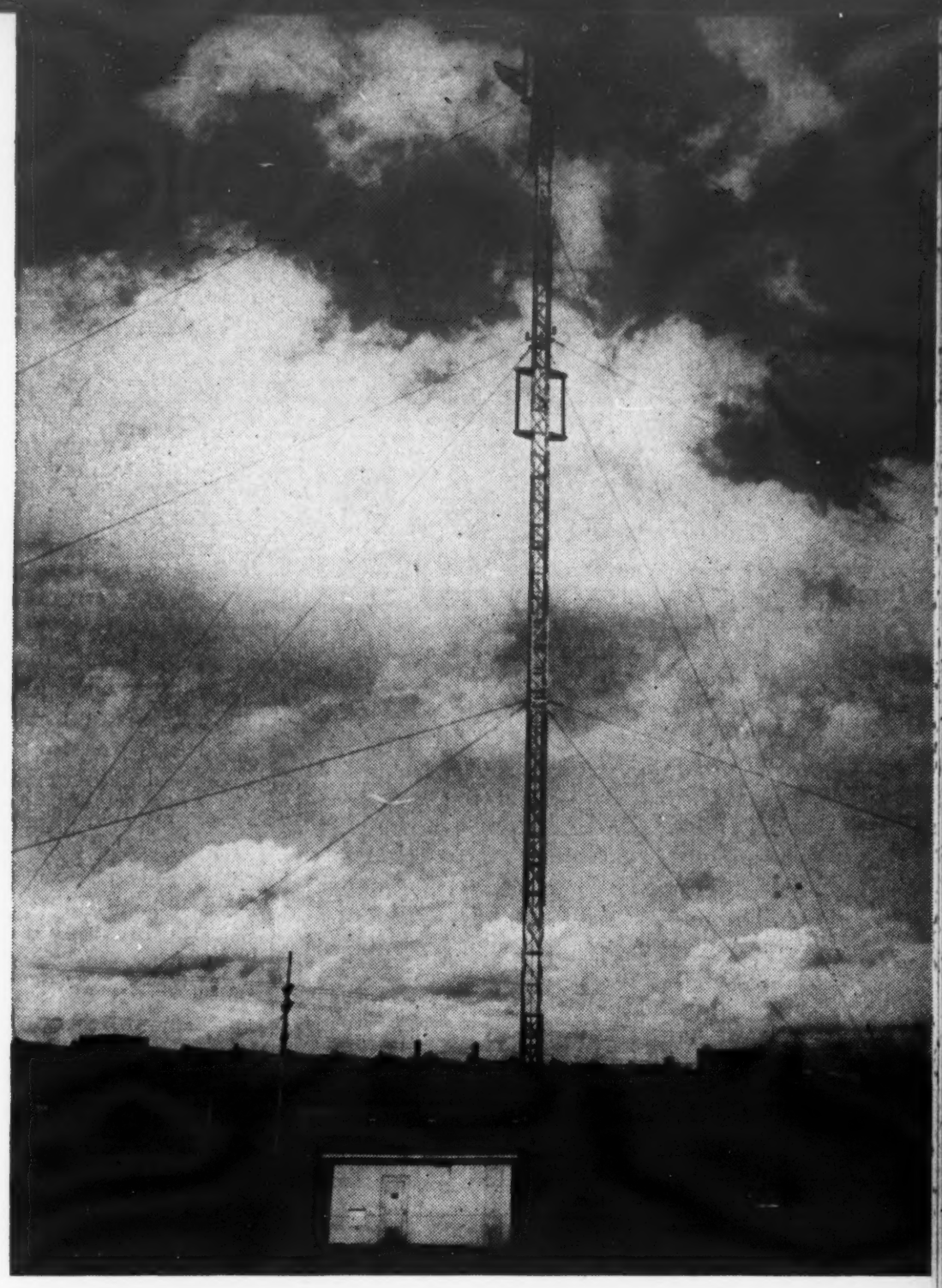
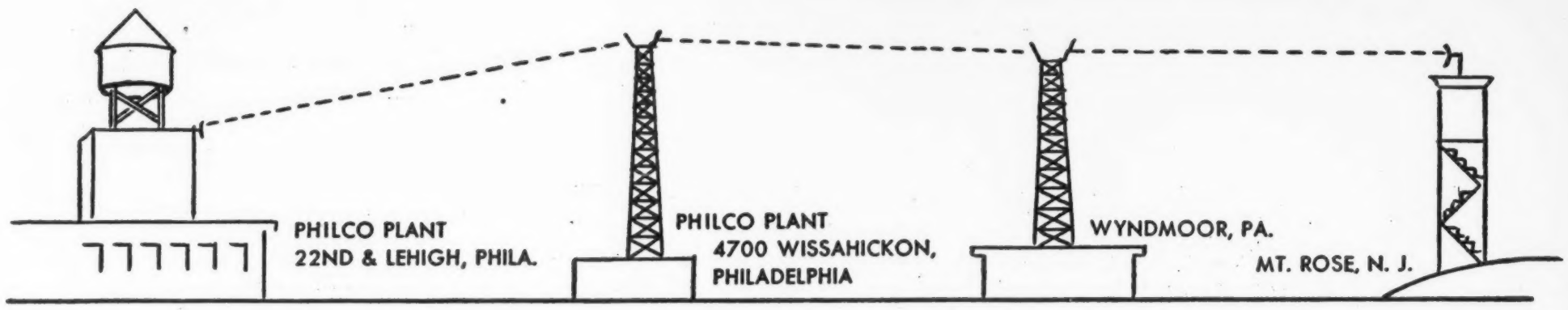
PHILCO "PROVING GROUND" FOR MICROWAVE



Philco 160-foot microwave tower at 4700 Wissahickon . . . one of four similar Philco test sites in the Philadelphia area.



To supply industry's mounting demand for modern, efficient and private communications which do not depend on vulnerable wire lines, Philco is installing thousands of miles of new microwave for oil and gas pipelines, utilities, railroads and other major industries. Constantly improving the performance and reliability of Philco microwave equipment, each newly designed component and equipment is field tested and perfected on Philco's experimental microwave system . . . the equivalent of a 70-mile commercial installation . . . Another reason why Philco Microwave leads the field in quality, performance and reliability . . . Good reason why Philco is the world's leading manufacturer of microwave equipment.

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Chapter News

Atlanta

Kelly Mosley, Georgia Manager of the Southern Bell Telephone and Telegraph Company, was re-elected president of the Atlanta Chapter at the May 25th meeting at the Officers Club, Atlanta General Depot. More than 200 members and guests attended the dinner meeting which was addressed by Elliott Jackson, Civil Defense Director for the Atlanta metropolitan area.

Other officers chosen were: vice-presidents—Col. A. R. Morley, Signal Officer, Third Army; H. Jack Evans, Western Union; R. J. Smith, Atlanta General Depot; Carl Garlington, Georgia Tech; secretary-treasurer—Richard L. Janss, Southern Bell.

Mr. Jackson discussed civil defense problems in the Atlanta area and described the communications setup of the organization.

President Mosley reported on the national convention he had attended in Washington and reviewed the highlights of the program of events.

During the evening, the *Dixie Business* Magazine distinguished service award was presented by its editor, Col. Hubert Lee, to Lt. Col. Robert N. Bond, Signal Supply Officer of the Atlanta General Depot.

Augusta-Camp Gordon

Lt. Col. George McNally, commanding officer of the White House Signal detachment, was guest speaker at the chapter's April meeting and gave a most interesting talk on his duties and that of his detachment in furnishing the President with ample communication facilities at the White House as well as throughout his travels both at home and abroad.

At the May 20th meeting, Chapter President W. O. McDowell gave a comprehensive report on the events of the national convention. Col. H. A. Buck, chairman of the chapter membership committee, advised that the membership drive was making good progress.

The main speaker was J. B. Fuqua, president of radio and television station WJBF, Augusta. He reviewed the advances made by the television industry and made predictions for its progress in the future. He also pointed out the tremendous expense involved in setting up and operating a television station and, as an example, exhibited a tube which acts as the eye of the camera and which alone costs $1,200.00.

The meeting was held at Timmerman's in Augusta, with a social hour preceding.

Chapter of the Year

The Baltimore Chapter, which distinguished itself in all phases of chapter activity, was officially named 1953-54 Chapter of the Year at the national convention. The Chapter of the Year award, an engraved plaque, was presented to George C. Ruehl, Jr., two-term president of the Baltimore Chapter, by Executive Vice President George Dixon during the 8th Annual Banquet.

Certificates for first place in each of the four categories of the contest were awarded to the following: Fort Monmouth—largest number of new members; Louisiana—highest percentage of new members; Augusta-Camp Gordon-maximum number of regular meetings; Baltimore—highest percentage of renewals. In addition, Baltimore placed second, third and fourth in the other categories, and was the only chapter to place in each.

Baltimore

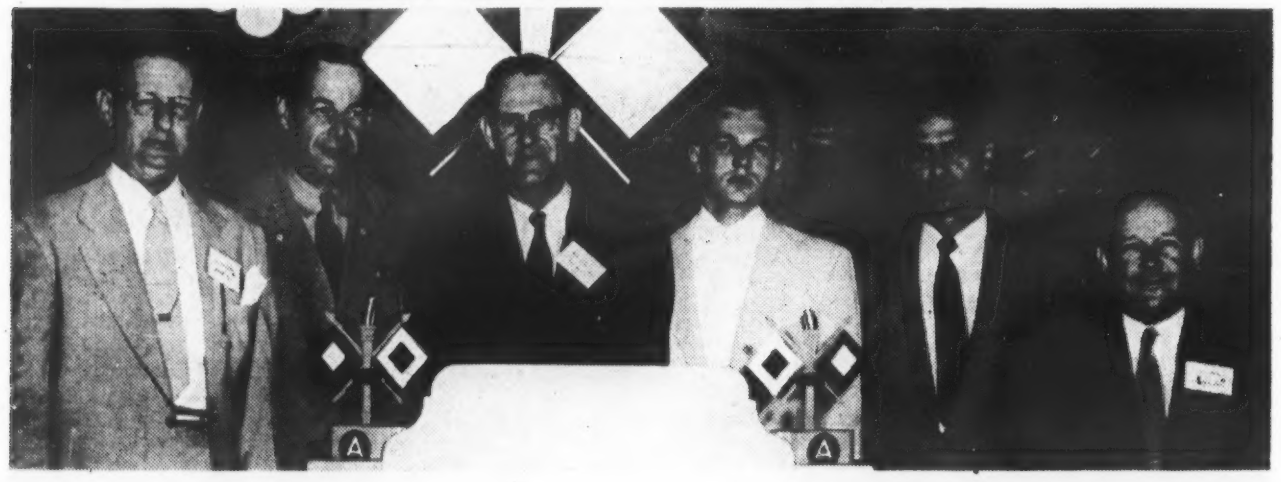
The Chesapeake & Potomac Telephone Company was host to the chapter on April 20th, with a tour of its facilities highlighting the evening's program.

Company officials at the head table were introduced by President George Ruehl as follows: Robert B. Alexander, general plant manager; Eric Greenleaf, chief engineer; and Page Worthington, general commercial manager. An interesting demonstration of a direct dial call was placed from the speakers' table by Mr. Ruehl to AFCA Executive Vice President George P. Dixon at his home in Alexandria, Va. Through the use of a speaker system, both sides of the conversation were heard by all present.

Mr. Alexander welcomed the chapter members and guests and outlined the facilities and services to be viewed on the conducted tour which followed. Among the many items explained and demonstrated on the tour were the long distance service, industry and private teletypewriter service, radio program service, regular and hi-fi television service and the relay room housed on the roof.

The cross-country long distance dialing was also demonstrated, as was a wire-wrapping tool which is now used instead of soldering. The remainder of the tour covered the traffic room; the AT&T room which contains the private line teletypewriter switchboard; the toll test board which handles any difficulty an operator may have in putting through a call; and the TV monitoring section.

Newly elected officers of the Atlanta Chapter, l to r: H. Jack Evans and Col. A. R. Morley, vice presidents; Kelly Mosley, president; Carl Garlington, vice president; Dick Janss, secretary-treasurer; R. J. Smith, vice president.



Boston

Capt. David R. Hull, USN(Ret.), vice-president of Raytheon Manufacturing Company, was elected president of the Boston Chapter at its annual meeting on May 13th.

The other new officers are: vice-presidents—Gardiner Greene, The Gabriel Co.; Frank Lyman, Jr., Cambridge Thermionic Corp.; secretary — Cdr. John F. Sargent, USN(Ret.); treasurer —William Melanson, Cambridge Thermionic Corp.; directors—Paul F. Hannah, Raytheon Manufacturing Co.; Raymond B. Meader, New England Telephone and Telegraph Co., retiring chapter president; Rear Adm. Thomas F. Halloran, Greater Lawrence Citizens Committee; Glenn H. Browning, Browning Laboratories, Inc.

Committee chairmen for the coming year were named as follows: program—Louis J. Dunham, Jr., Franklin Technical Institute; membership — Dan Greene, New England regional sales engineer; publicity and reception — William Holdich, Boston Naval Shipyard.

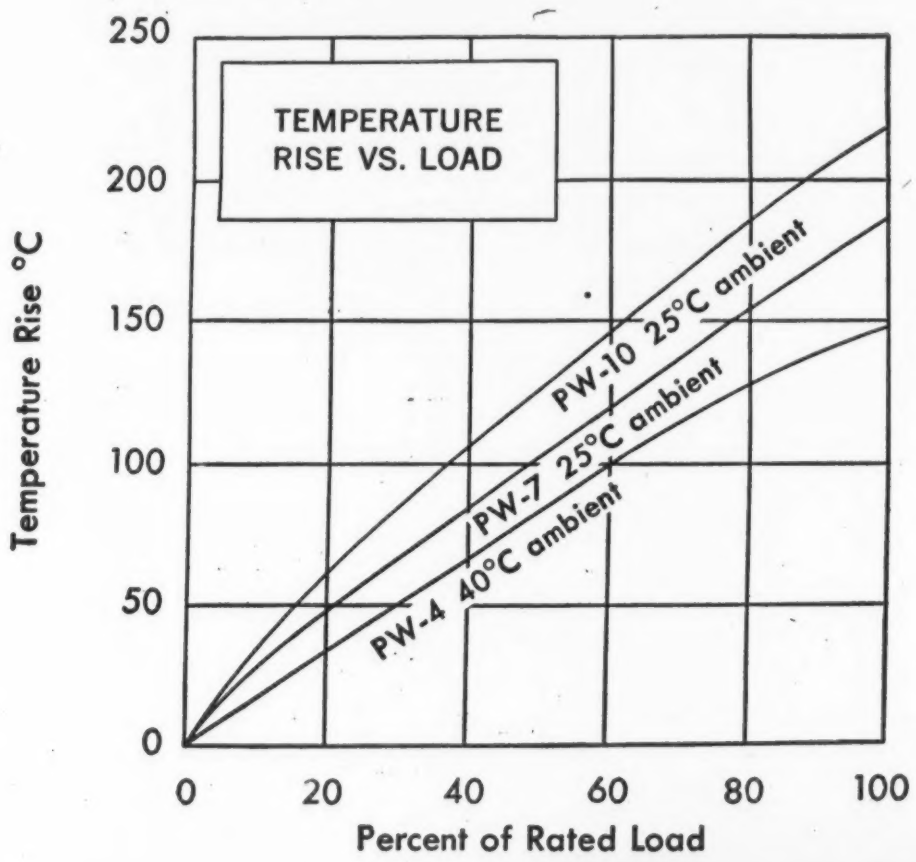
Guest speaker was A. V. Loughren, director of research, Hazeltine Corporation, who explained and demonstrated the principles of color television transmission as approved by the FCC. He also predicted that by 1960 no more black and white receivers would be in mass production.

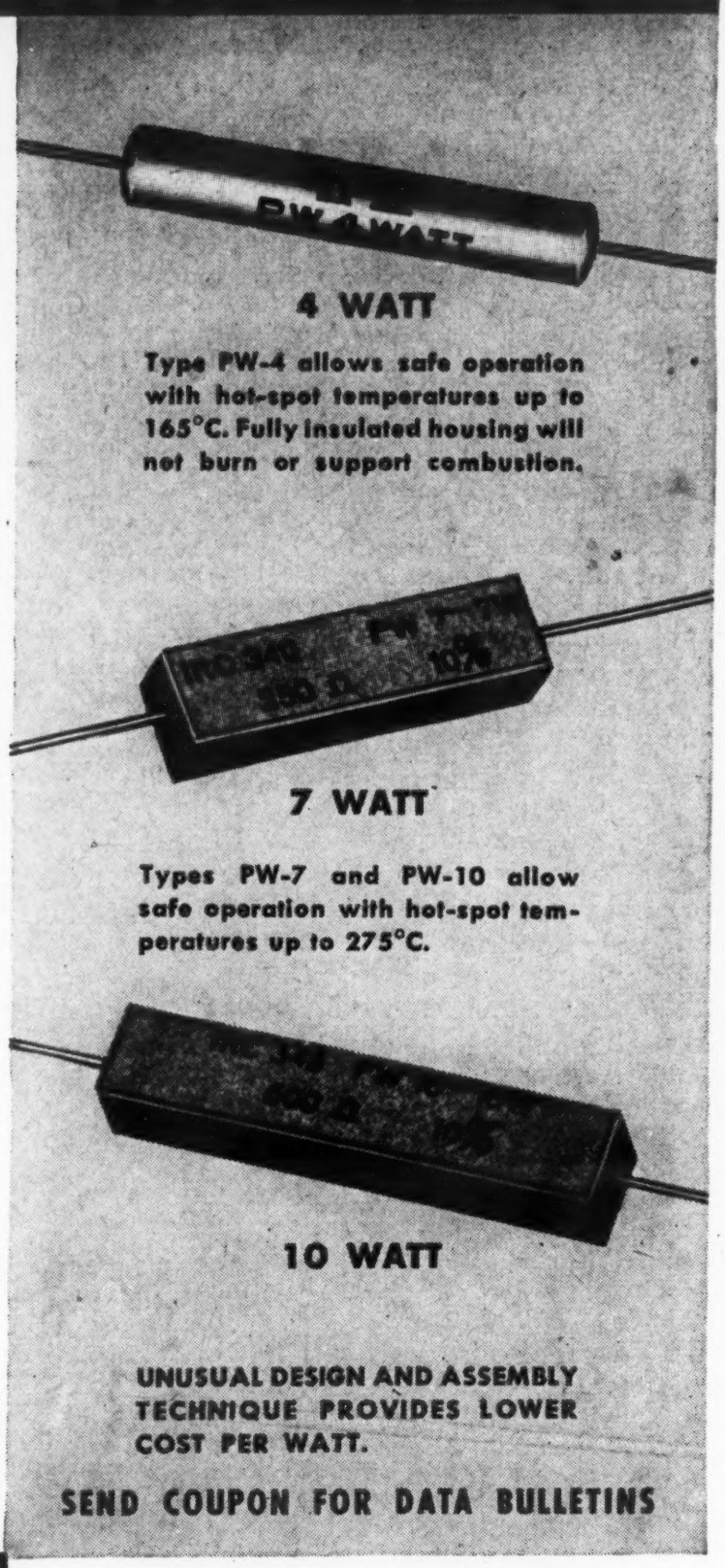
Mr. Loughren was well qualified to discuss this subject. He was a vice chairman of the NTSC and chairman of the panel on color video standards, and

NOW

3 *new* wire wound resistors

IRC's new power wire wounds are lower cost per watt than any other power type. At 4, 7 and 10 watts, they offer savings of several cents each in any application requiring compact, low cost, efficient power resistors. Types PW-4, PW-7 and PW-10 resistors assure safe operation in circuits where stability and low wattage dissipation are needed.




PW 4 WATT
4 WATT
Type PW-4 allows safe operation with hot-spot temperatures up to 165°C. Fully insulated housing will not burn or support combustion.
7 WATT
Types PW-7 and PW-10 allow safe operation with hot-spot temperatures up to 275°C.
10 WATT
UNUSUAL DESIGN AND ASSEMBLY TECHNIQUE PROVIDES LOWER COST PER WATT.
SEND COUPON FOR DATA BULLETINS

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Precision Wire Wounds • Ultra HF and Hi-Voltage Resistors • Selenium Rectifiers • Insulated Chokes • Hermetic Sealing Terminals •

IRC

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Please send ☐ Bulletin P-1 on PW-4 Resistors
☐ Bulletin P-2 on PW-7 and PW-10 Resistors.

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last year received the David Sarnoff Medal Award by the SMPTE for contributions to the development of commercial color television.

Chicago

Approximately 200 members and guests attended the March 31st meeting at the Kellogg Switchboard & Supply Company. Special guests of the chapter were the 23 members of the Kellogg-sponsored 492 Signal Installation Company who staged a demonstration of Signal Corps equipment manufactured by Kellogg. Capt. Orvil Ostberg, commanding officer, briefly described the program of the reserve unit which was organized in 1948. Three communications training programs are carried on simultaneously in the weekly meetings at the plant: currently, one group is analyzing and testing component parts of the telephone; another is engaged in building a radio receiver; and the third is reconditioning an older-type switchboard for "field use."

"Communications Serves United Air Lines" was the subject of an illustrated talk by H. L. Garrison, superintendent, ground communications, United Air Lines, in which he described communications as a life-line in operations, sales and administrative levels.

On the operational level, Mr. Garrison said, communications between aircraft in the air and ground dispatchers is achieved through high frequency radio stations located at New York, Cleveland, Chicago, Omaha, Denver, Salt Lake City, Seattle, San Francisco and Los Angeles; and through very high frequency radio stations located approximately every 100 miles along the UAL routes from coast to coast and up and down the west coast. These stations are connected by telephone lines to comprise nine individual radio networks in each of which all transmitters and all receivers operate simultaneously as one station. Through a PLF (private line fone) system for use in discussions and a PLT (private line teletype) system for routine exchange of detailed information, 90,000 messages a day are delivered over 25,000 miles of lines to 226 receiving offices.

The Chesapeake & Potomac Telephone Company was host to the Baltimore Chapter recently. Shown above are some of the members during the conducted tour of the company's facilities.

Heart of the sales system for United Air Lines, the speaker stated, is Payload Control. located in Denver operating base headquarters. All sales throughout UAL are recorded on master charters in Payload Control, reports of sales being made over a PLF telephone system comprising 7,000 circuit miles connecting 37 major UAL reservations offices with Payload Control either directly or through switching arrangements at outlying offices. Smaller offices are served by the PLT system. By special automatic connecting switches in the PLT switching centers, Payload Control broadcasts urgent teletype messages which are delivered to all reservations offices within two minutes.

Referring to the teletype system as the "work horse" in the administration of UAL business, Superintendent Garrison said that information on all flights flows constantly into statistical production in Denver operating base headquarters and is digested in IBM machinery to form over 1,500 types of administrative information. Summary of this information covering each day's business is teletyped to Chicago and placed on the executive vice president's desk before 8 AM the following morning. Administrative coordination between the president's office in Chicago, operating base headquarters in Denver, and the overhaul and repair base in San Francisco is attained through an administrative PLF connecting Chicago with Denver, and Denver with San Francisco. A switching arrangement allows the two circuits to be used independently, or with all three offices in conference. Once-a-week staff meetings and round table discussions between the three cities are conducted by the president.

Chapter President William C. DeVry and his company, the DeVry Technical Institute (formerly DeForest's Training, Inc.) were hosts to the chapter on April 28th.

At the March meeting, Mr. DeVry had announced the changes which had recently taken place in the activities of the DeVry Corporation, a long time manufacturer of motion picture and sound equipment, and that the DeVry activities would now be concentrated on the training of people for electronic work. The new DeVry Technical Institute is one of the largest technical institutes of its kind in the country, teaching most phases of industrial electronics, nuclear instrumentation, electronic controls and television.

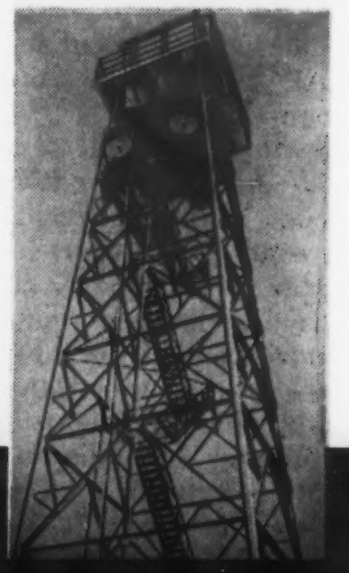
Rear Admiral Daniel Vincent Gallery, Jr., Chief of Naval Air Reserve Training in the U. S., was a special guest and addressed the chapter. Admiral Gallery is famous for his capture of the German submarine U-505 intact during World War II.

Following a talk by Mr. O. I. Thompson, Director of Education of the Institute, the members and guests were con-

Chicago's spring meeting was held at the Kellogg Switchboard and Supply Company. Top photo shows (l to r): guest speaker H. L. Garrison of United Air Lines; James H. Kellogg, president of the host company; and Chapter President William C. DeVry. Chapter members in lower photo are (l to r): Col. Louis V. Germain, SigC, Fifth Army Hqs.; T. P. Leddy, asst. vice-president of Kellogg; Col. John R. Howland,, commercial sales manager, Stewart-Warner Corp.; and H. C. McCluskey, Kellogg executive vice-president.

IN ITS 21 TOWER MICROWAVE SYSTEM

Western Union uses Sperry Klystrons

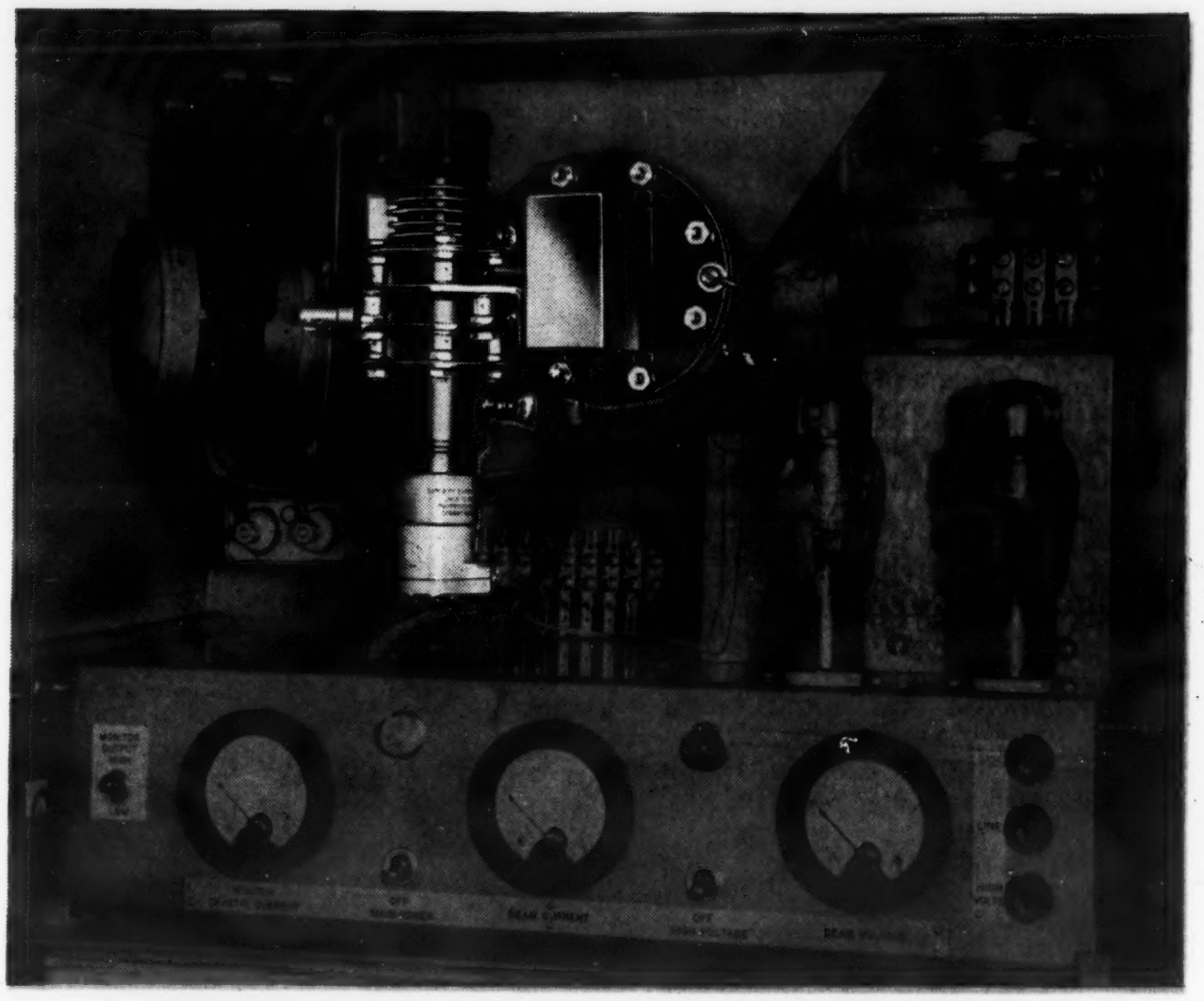


"Dependability has been excellent," writes H. P. Corwith, Vice President, Development and Research. "Average tube life has been more than 15 months, and some tubes have been in continuous service for almost 3 years."

■ Installed in 1948, the Western Union microwave system between New York, Philadelphia, Washington and Pittsburgh, consists of 21 towers, varying in height from 60 to 120 feet, and spaced up to 55 miles apart. The system handles hundreds of telegraph circuits—including important government and leased private wire systems as well as circuits for regular message traffic.

■ Through the use of Sperry SAC-41 Klystrons providing power output of 10 watts, Western Union has effectively reduced circuit outages due to fading, and provided dependable service under all conditions. Furthermore, as Mr. Corwith points out above, the average life of Sperry SAC-41 Klystrons has been 15 months—and some tubes have served continuously for almost 3 years.

■ Since 1938, when Sperry sponsored the development of the Klystron, this Company has extended its application to tubes for low, medium and high power applications—and in a frequency range from 750 to 40,000 megacycles. The research, development and specialized production facilities of Sperry in Klystrons – and in accompanying Microline* equipment—are at your disposal to help in solving your problem.



*T.M. REG. U.S PAT OFF

SPERRY GYROSCOPE COMPANY
DIVISION OF THE SPERRY CORPORATION

GREAT NECK, NEW YORK • CLEVELAND • NEW ORLEANS • BROOKLYN • LOS ANGELES • SAN FRANCISCO • SEATTLE
IN CANADA • SPERRY GYROSCOPE COMPANY OF CANADA LIMITED, MONTREAL, QUEBEC

ducted on a tour of the facilities.

Motorola, Inc. played host to the chapter on May 27th at its new Franklin Park TV bulk assembly plant in suburban Chicago.

Following a cocktail party and smorgasbord dinner, served in the plant cafeteria, chapter President William DeVry conducted a short business meeting. Henry McDonald, chapter secretary, gave a detailed report on the recent convention of the AFCA.

Guest speaker was Daniel E. Noble, Motorola vice president in charge of the company's communications and electronics division, who addressed the group on the topic "I Vote for Reason." In his talk he emphasized the need for an intelligent approach to the solution of reliability in electronic systems.

Following Mr. Noble's talk, the group of 225 members and guests boarded special in-plant "Tow-veyor" cars for a tour of the plant area. The cars, powered by a unique, overhead conveyor system, are used to transport materials throughout the spacious, ultra-modern plant.

Dayton-Wright

The chapter held its April 27th meeting at the WLW-D television studios. A special tour was conducted by Lester Sturgill, chief engineer, who also demonstrated how the station makes sure it is transmitting the best possible picture. The members were also given an opportunity to look behind the scenes of television presentations and see how a number of special effects are obtained.

New officers were elected at the May meeting. They are: president—Roy L. Merwin, Jr., General Electric Company; vice-presidents—Harry C. Blackburn, Sylvania Electric Products, Inc., Col. F. J. Shannon, Sr., Air Materiel Command; John E. Wilkinson, American Phenolic Corporation; secretary-treasurer—Miss M. Jane Hurley, General Electric Company; directors—W. M. Hilt, Hoffman Laboratories; Col. S. J. Gadler, WPAFB; John E. Keto, WADC; William Klein, Collins Radio; A. S. Lord, AMC; R. J. McIlrath, Raytheon Manufacturing Co.: Brig. Gen. C. H. Mitchell, WPAFB; Paul Quammen, Allen B. DuMont Labs, Inc.; Al Schmahl, Sylvania Electric Products, Inc.; Leon Vangunten, WADC.

Detroit

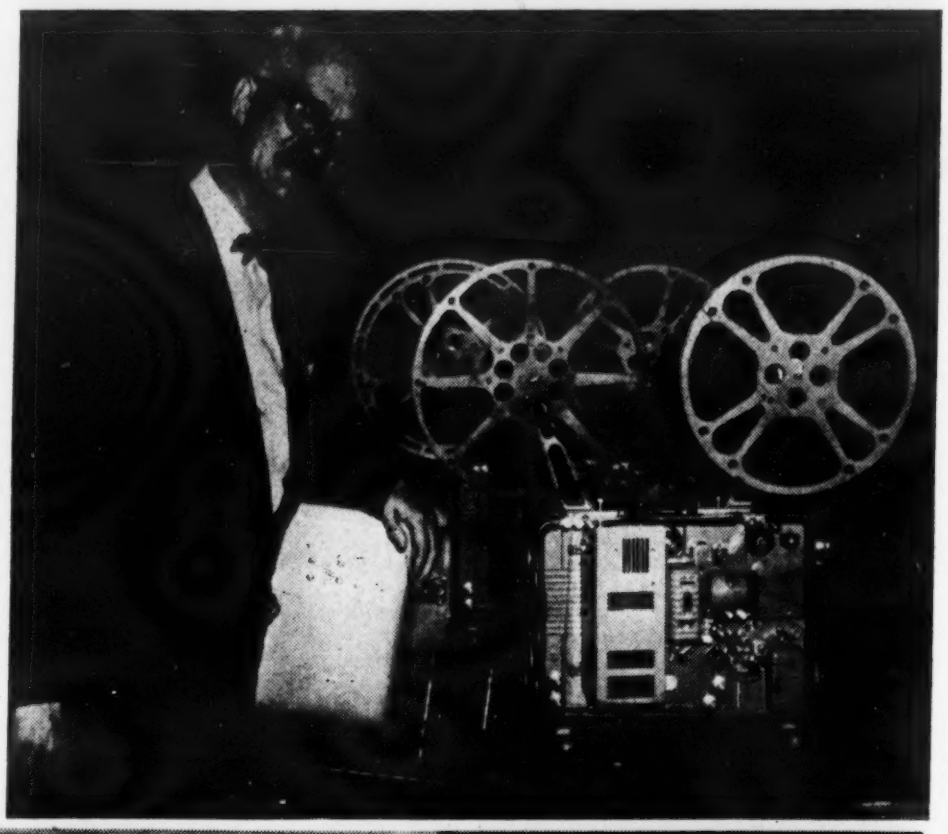
A tour of the Air Defense Control Center at Willow Run Airport, Ypsilanti, Michigan, was the feature of the chapter's May 26th meeting.

Fort Monmouth

The new Signal Corps School auditorium in Myer Hall was the scene of the Xenon arc light demonstration which featured the Fort Monmouth Chapter's April 29th meeting. Mr. Ellis W. D'Arcy, chief engineer in projector development for the Bell and Howell Corporation, presided over the demonstration featuring the new Xenon arc light motion picture projector.

Two 16mm motion picture projectors were set up in the rear of Myer Hall auditorium projecting two pictures next to each other on an 8 x 20 screen. One projector employed the regular mazda lamp while the other used the new Xenon arc lamp. In this manner the audience could compare the quality of one picture alongside of the other.

The Xenon arc light picture was far more clear and bright than that produced by the mazda. Xenon, D'Arcy explained, is a rare gas producing in this lamp an arc five times as bright as those presently used. It is the closest thing to daylight, he said, and is not in general use because of the great length of time in development.



Fort Monmouth's April meeting was addressed by Ellis W. D'Arcy of Bell & Howell Corp. (shown at right). Lower photo, taken during chapter's May meeting, shows (l to r): George W. Bailey, AFCA national president; Col. Paul Langguth, chapter president; Donald F. McClure, national director; and Dr. Thornton L. Page of Johns Hopkins University, featured speaker.

Part of the film "Salome," starring Rita Hayworth and Stewart Granger, was used to make the lamp strength comparisons. The rich colors in this film served to point up the advantages of the Xenon arc light. Mr. D'Arcy made it clear that this arc development would be important to the color television industry because of its great sensitivity in all colors from the ultra-violet to the infra-red.

During the question and answer period that followed, Mr. D'Arcy stated that the Xenon lamps would be more expensive than the mazda type but incorporate the quality of lasting far longer. He added that in the Bell and Howell projectors now using these arcs a reflector is used giving the light 50% more strength. At the conclusion of the question and answer session, a short color film of various Fort Monmouth scenes was shown, using the Xenon arc light and an anamorphic lens which produces the wide-angle or cinemascope picture.

Gibbs Hall was the scene May 27th of the closing meeting in the current season for the Fort Monmouth Chapter, with some 250 members and guests in attendance.

Guests included Maj. Gen. Edward C. Rose, Director of Defense for the State of New Jersey; Edward J. Patten, Secretary of State for New Jersey; George W. Bailey, AFCA National President; and Donald F. McClure, assistant vice president of the New York Telephone Company and a national director of the AFCA.

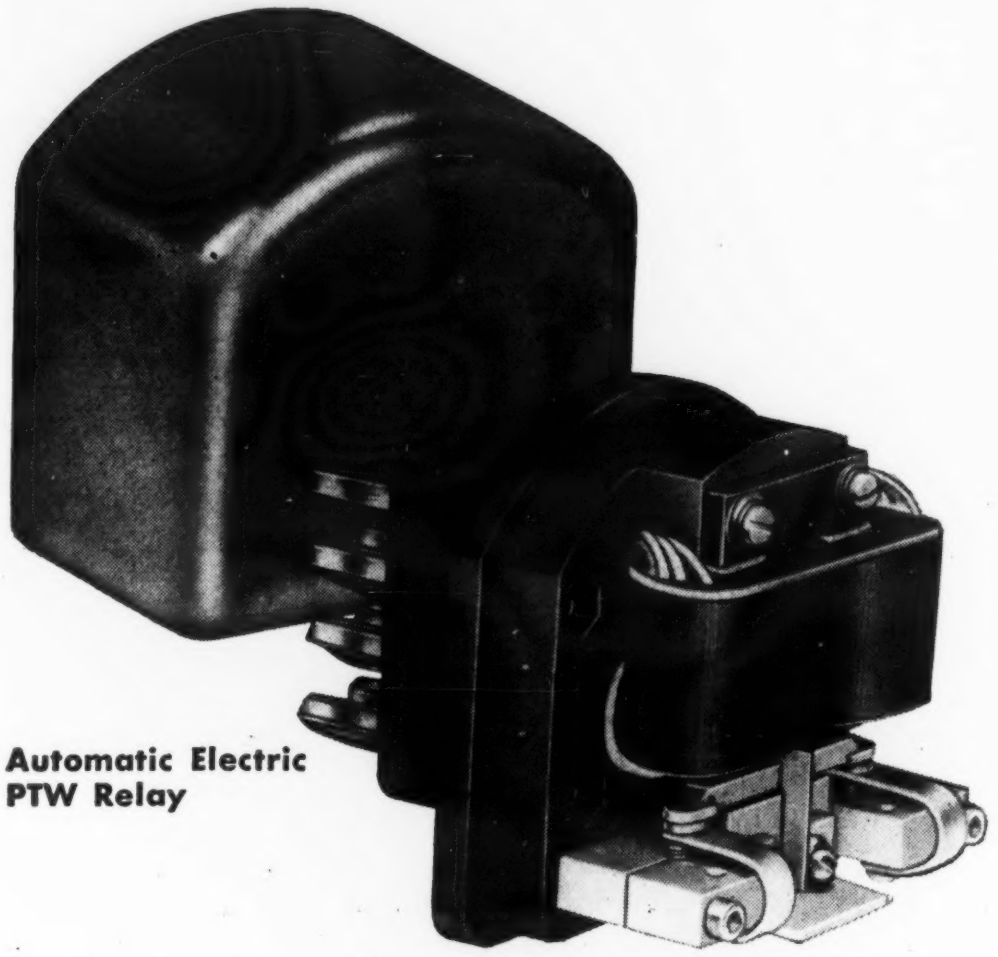
After dinner, a short business meeting was highlighted by brief talks from Maj. Gen. Kirke B. Lawton, Brig. Gen. Wesley T. Guest, General Rose, George Bailey and Don McClure.

The main speaker of the evening was Dr. Thornton L. Page, a leading astrophysicist and a deputy director of the operations research organization at Johns Hopkins University whose job it is to analyze warfare scientifically.

Thomas A. Edison, Dr. Page stated, probably made the first mathematical application to military operations but his findings were filed away and never used. It was only under the pressure of the Second World War that the military services felt the need for the ap-

New polar relay...

sensitive, rugged, compact!



Automatic Electric
PTW Relay

Here's a new polar relay that will soon be setting records for long service life! Its sensitivity gives peak performance for high-speed polarized pulse repeating, or for applications where low current is transmitted over long lines. The Series PTW Relay is also recommended for line-current direction indication or as a differential relay in the "Wheatstone Bridge" type of control. Advanced features include:

simplified design and long service life

New design eliminates many parts and adjustments formerly required. Relay gives *billions* of operations without re-adjustment.

extreme sensitivity

Unit operates on currents as low as 2 to 12 milliamperes, depending upon number and combination of windings used. Signals as low as 10 milliwatts through the two line-windings will "trigger" the relay.

reduced bounce and wear

A new method of armature support limits longitudinal movement. There are no bearings to wear . . . the usual rocking motion in contact make-and-break is reduced. Armature bounce is virtually eliminated; contacts last longer.

improved characteristics in smaller size

Because of increased magnetic efficiency, the coils take less space and need fewer turns. The lower coil impedance of this compact unit gives improved characteristics.

fast response

Travel time is as low as .9 milliseconds, depending upon contact gap and windings used.

send for circular

For a small, fast, sensitive polar relay that out-performs and outlasts all others, specify this new Automatic Electric Series PTW Relay. For details ask for Circular 1821. Write: Automatic Electric Sales Corporation, 1033 West Van Buren St., Chicago 7, Ill. In Canada: Automatic Electric (Canada) Ltd., Toronto. Offices in principal cities.

RELAYS SWITCHES

PRODUCTS OF THE INDUSTRIAL DEPARTMENT OF

AUTOMATIC ELECTRIC

CHICAGO

helpful technical data

Make and Break—75% total "make" on both contacts at 60 cycles per second with .006" contact gap and 23 milliamperes of sine wave ac. Simple, easy re-adjustment can be made in the field.

Windings—Four windings: two line-windings, each 139 ohms resistance and only .5 henry inductance; other two windings, each 101 ohms and .125 henry. The number of coil turns to be placed in series aiding can vary from 1400 to 8400.

Cover—Snap-on cover easily removed for inspection and adjustment of relay.

Mounting—Jack mountings, available for flush or surface mounting.

Size—2¼" wide, 2½" deep and 2 11/16" high (plus ⅝" projection of banana plugs).

For more detailed information, ask for Circular 1821.

plication of the scientific method to their operations and even then the movement was started in Great Britain. From Great Britain the U. S. Navy took up this scientific technique and from there it spread to all the services.

Dr. Page devoted most of his talk to the use of scientific teams in industry. He stated what was once called efficiency experts are rapidly being transplanted with specialists teams. These teams are made up of many different kinds of specialists who collectively pool their specialties to come up with a solution. The difficult problem, he said, is the coördination of this group and the wise selection of its members. He went on to say that the problem to be solved often is very difficult to put in terms of an equation or a model easy to work on. He explained that the Army solved its problem of color integration by this scientific method. A number of other examples were given in which problems arising out of the vastness of great industry were solved by this method. "Optimization" is the term he used to explain one of the systems used by these specialist teams to get a balance between cost and effectiveness and is used to great advantage in both the military and private industry. Dr. Page feels that this new approach to the old method of making improvements will become much more important in the years to come.

Gulf Coast

New officers were elected at the May 17th meeting as follows: president—James C. Dabney, Southern Bell Telephone and Telegraph Company; vice-presidents—Ancil Z. Arseneau, Keesler AFB; Lt. Col. Kenneth L. Huez, Hq. TTAF; Capt. Antenor N. Lee, Keesler AFB; secretary—Rodney M. Van Loon, Keesler AFB; treasurer—Joseph J. Evangelista, Keesler AFB.

The June 3rd meeting featured a lecture-demonstration entitled "Is your voice really you?" by Miss Wyvonne Mattox, representative of the Southern Bell Telephone and Telegraph Company.

Miss Mattox discussed the right and wrong way of speaking the everyday English language and demonstrated by playing magnetic tape recordings. At the conclusion of her talk, each member was permitted to record and play back his own voice, thereby checking his own speaking characteristics.

Chapter President James Dabney announced the appointment of the following committee chairmen: program—Thomas M. Ingling; meeting place—Capt. A. N. Lee; membership—Lt. Col. K. L. Huez; publicity—R. M. Van Loon.

Hawaii

The chapter staged a very successful social meeting on April 22nd at Fort Shafter Officers Open Mess. The evening's program included a cocktail party, a roast beef dinner, and dancing. Sixty members and guests were present.

Kansas City

Carleton L. Buell, Western Union Telegraph Co., was elected president of the chapter at the annual election of officers on April 21st. Other officers chosen were: vice-presidents — A. B. Stewart, Southwestern Bell Telephone Co.; Col. C. E. McBrayer, Director Communications & Electronics, Central Air Defense Force; and R. R. Williams, American Telephone and Telegraph Co.; secretary-treasurer—E. L. Parkington, Western Union.

The meeting was held at the Wishbone Restaurant and featured a demonstration of network color television in the Kansas City area. Most of the seventy-five members and guests had not previously seen a color telecast and enjoyed it immensely.

Chapter members attended the Armed Forces Day Show at the Grandview Air Force Base on May 15th. The show included the exhibition of the NIKE guided missile, the C-154 Globemaster cargo plane, the 75-mm. gun called the "Skysweeper," and many other interesting features such as a low level "strafing attack" with P-51 Mustang fighters staged by the Marines.

New York Chapter's April 28th meeting was held at the New York Naval Shipyard, Brooklyn, and included a tour of the installation. Capt. Walter E. Linaweaver, Asst. Director of Naval Communications (at right), was guest speaker. Lower photo shows a portion of the attendance.

Louisiana

A dinner-meeting was held at the Officers Club, Camp LeRoy Johnson, on June 10th, with a friendship hour preceding.

President "Bud" Walther reported on his recent trip to Europe, and Vice President Charles Pearson reviewed the events of the AFCA national convention at which he had represented the Louisiana Chapter.

The program featured a lecture-demonstration on recent development in military radio by Major Francis J. Schecher, Overseas Supply Division, New Orleans Port of Embarkation.

New York

The chapter's April 28th meeting was held at the New York Naval Shipyard, Brooklyn. The members and guests were first taken on a tour of the shipyard which was arranged by Capt. P. C. Crosley, Chief of Staff, Eastern Sea Frontier. Some of the shipbuilding, repair work and other activities within the Naval Shipyard were observed.

Guest speaker was Capt. Walter E. Linaweaver, Assistant Director of Naval Communications, representing Rear Admiral W. B. Ammon, Director of Naval Communications, who was unable to attend because of illness.

Capt. Linaweaver discussed integration of military communications within the Department of Defense. He indicated that the state of command structure was governed to a large extent by communications. A single command will have a unified communication system and that communication is the voice of command. He also recited many interesting and amusing experiences in communication coordination between the Army and Navy in Manila at the outbreak of World War II and the means which were taken to have a common communication structure.

Touching upon his more recent experiences with Air Force and Navy Communications during the Korean conflict, he told the story of a North Korean supply train being located by an Air Force pilot who was out of bombs. The pilot radioed this information which was picked up by a Naval destroyer a few miles away. The destroyer promptly approached the coast and was able to blow up the enemy supply train by shell fire as directed by the Air Force pilot.

Distinguished guest of the chapter was Rear Admiral R. H. Hillenkoetter, Commandant, Third Naval District and Naval Base New York.

The May 26th meeting featured the important subject of electronic component testing and the methods employed by modern testing laboratories in checking the fitness of electronic equipment for military and commercial applications. The guest speaker was Mr. A. J. Boscia, Director of Test Section, Electronic Components and Materials of the New York Testing Laboratories, who illustrated his talk, "Environmental Testing — A Proving Ground for Electronic Components and Materials," with demonstrations of environmental testing methods and procedures.

Vice Admiral Walter S. Anderson, chapter president, reported on the national convention held in Washington earlier in the month, and stated that the New York Chapter had been selected as host to the 1955 convention. He also announced that Col. Benjamin H. Oliver, Jr., of the New York Telephone Company, had been appointed chairman of the convention committee.

North Texas

The Adleta Show Case & Fixture Manufacturing Company were hosts to the North Texas Chapter on May 3rd. The social-business meeting, attended by more than 100 members and guests, was held in Adleta's auditorium and was highlighted with a color television show, "The Voice of Firestone."

Mr. Ed Miles, representing the Adleta Company, gave an interesting talk on the development of color television sets, predicting that in five years there will be more than ten million in operation in the United States.

Mr. Theo Mayfield of the Southwestern Bell Telephone Company explained the part that the American Telephone and Telegraph Company and its associated Bell Companies have played in developing facilities which have made it possible to transmit over long distances black and white and now color television signals.

An international flavor was added to the meeting by the presence of eight officials of the Mexican National Telegraph Company from Mexico City, headed by Subdirector General of Telecommunications, Major Francisco Diaz Recamier. The Mexican Company's officials were the guests of the Western Union Telegraph Company.

Philadelphia

Major General James D. O'Connell, Deputy Chief Signal Officer, addressed the April 8th meeting of the Philadelphia Chapter at The Franklin Institute. He described the efforts of the Army during the past year to save money by greater efficiency, citing such examples as: limiting new procurement of commercial-type items to the level required to maintain three months supply on hand or six months supply on order; direct shipment of commercial-type items from manufacturers to ports of embarkation or consuming installations; the increased use of open-end and call-type contracts for commercial-type and for many military-type items, wherever such contract types are feasible and economical; the disposal of obsolete or unneeded property; the installation of a financial property accounting system in the Signal Corps and other Army supply systems.

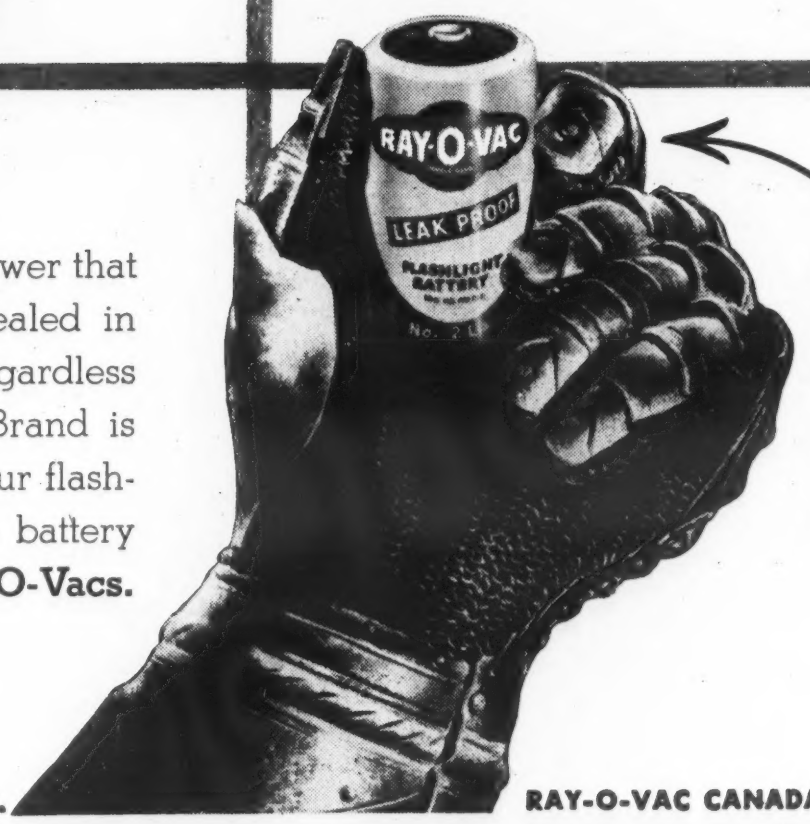
Referring to increased research and development in electronics as a paramount requirement for the Army, General O'Connell pointed out the following dramatic examples of what adequate research and development can mean in dollars and critical raw materials savings and a concurrent great increase in military effectiveness:

The dollars saved on the production of one single item, Wire WD-1, for the Korean conflict paid for the total research and development program of the Signal Corps for three post-war years; the savings in material were a

Ray-O-Vac

for a longer service record!

The only flashlight battery completely sealed in steel — top, bottom and sides!



Light when you need it from power that lasts, from power completely sealed in steel! These batteries stay fresh regardless of climate or age. LEAK PROOF Brand is guaranteed against corroding your flashlights. The top performer in the battery industry. **Be sure you stock Ray-O-Vacs.**

Feel the Steel... Steel's the Difference!

RAY-O-VAC COMPANY, MADISON 10, WIS. **RAY-O-VAC CANADA, LTD., WINNIPEG, MAN.**

million pounds of copper and 22,000,000 pounds of steel per year. At the same time, the increase in military effectiveness was about double that of the wire used in World War II. In addition, research and development in dry batteries resulted in savings in production for the Korean action sufficient to pay for the entire post-war research and development program for the Signal Corps for two years.

General O'Connell stressed the importance of establishing an adequate and practical long-range research and development program at this time since research and development can be done more effectively and efficiently when relieved of the urgent pressures of a shooting war.

Pittsburgh

Diversified plant tours featured three recent meetings of the Pittsburgh Chapter. Visits were made to the Swissvale Plant of the Union Switch and Signal Division of the Westinghouse Airbrake Company, to the Hamburg Bros. offices and warehouse, and to the Duquesne Brewery.

At the Union Switch and Signal plant the members saw a demonstration of the centralized traffic control console where a whole railroad could be controlled from one point. They were shown how Union Switch railroad communications equipment makes it possible to talk between trains, trains and wayside stations, and front to rear on freights. The flight simulator was also explained and demonstrated as far as security would permit.

Following a movie covering Union Switch railroad equipment, the company was host to the members and guests at an excellent dinner in the plant restaurant. Attendance was clocked at 165.

At Hamburg Bros., Clint E. Walters, color specialist of the RCA Service Co., Inc., delivered a lecture on the theory of color as the eye recognizes it, the various means of reproducing color in the printing industry, photographic color processes, and the various color television processes. He also explained, with slides and charts, the basic steps in the development of the RCA system of color television. An actual live color television broadcast, the Armstrong Circle Theater, was then shown to the group of 225 members and guests.

Ralph Will, Hamburg Bros. official and former president of the chapter, was host for the evening and distributed a number of door prizes. The gathering then adjourned to the company cafeteria for a buffet supper.

During their visit to the Duquesne Brewing Company of Pittsburgh the chapter saw how the largest selling beer in Pennsylvania is brewed at "The Most Modern Brewery in the World." They toured the brewhouse and marveled at the "electric brain" which controls and supervises the entire brewing operation.

The chapter reported that "an endless supply of beer was forced upon the willing members, and the evening wound up in the dining room where more beer was tested along with a fine array of food."

San Francisco

At its May 20th meeting the San Francisco Chapter was entertained by RCA Communications, Inc. The meeting began with dinner and a business session and was followed by a visit to the newly-constructed and recently-occupied Central Radio Office of RCAC.

The chapter's delegates to the national convention, Charles D. Jenkins of Remler Company, Ltd., and William D. McGuigan of Stanford Research Institute, gave detailed reports on the field trips, business and social events of the convention.

Harry E. Austin, vice president in charge of Pacific Coast activities for RCA Communications and a national director of the AFCA, welcomed the chapter to the new RCAC Central Radio Office and Pacific Coast headquarters and adjourned the meeting to the Central Radio Office a few doors away.

RCA Communications was host to the San Francisco Chapter at its new Central Radio Office on May 20th. Above, Harry L. Austin, RCAC vice president for Pacific Coast activities, explains terminal equipment facilities.

At the center, Mr. Austin and his staff conducted groups through the new four-story building and explained the operations of all the departments. Mr. Austin stated that this new Central Radio Office, with feeder branches in other parts of the city and transmitters and receivers in Marin County, north of San Francisco, was the Pacific gateway for RCAC. He particularly pointed out that this new building had been designed precisely for the communications functions which it houses.

The operating center on the first floor of the building includes batteries of printers and tape equipment for transmitting, receiving, and relaying messages from points in the Pacific area and the Far East. Facilities on the second floor include terminal and relay equipment for trans-Pacific broadcast program service, radio-photo service, leased teleprinter channels, and TEX — a new RCAC teleprinter exchange service between customers' local and overseas offices. Greetings to the chapter were received from RCAC Hawaii over these facilities while the chapter was touring the center.

The third floor of the building is occupied by executive offices of the Pacific Coast activities. This modern building, it was mentioned, is advantageously located adjacent to San Francisco's financial district and two blocks from the future World Trade Center under construction on the San Francisco waterfront.

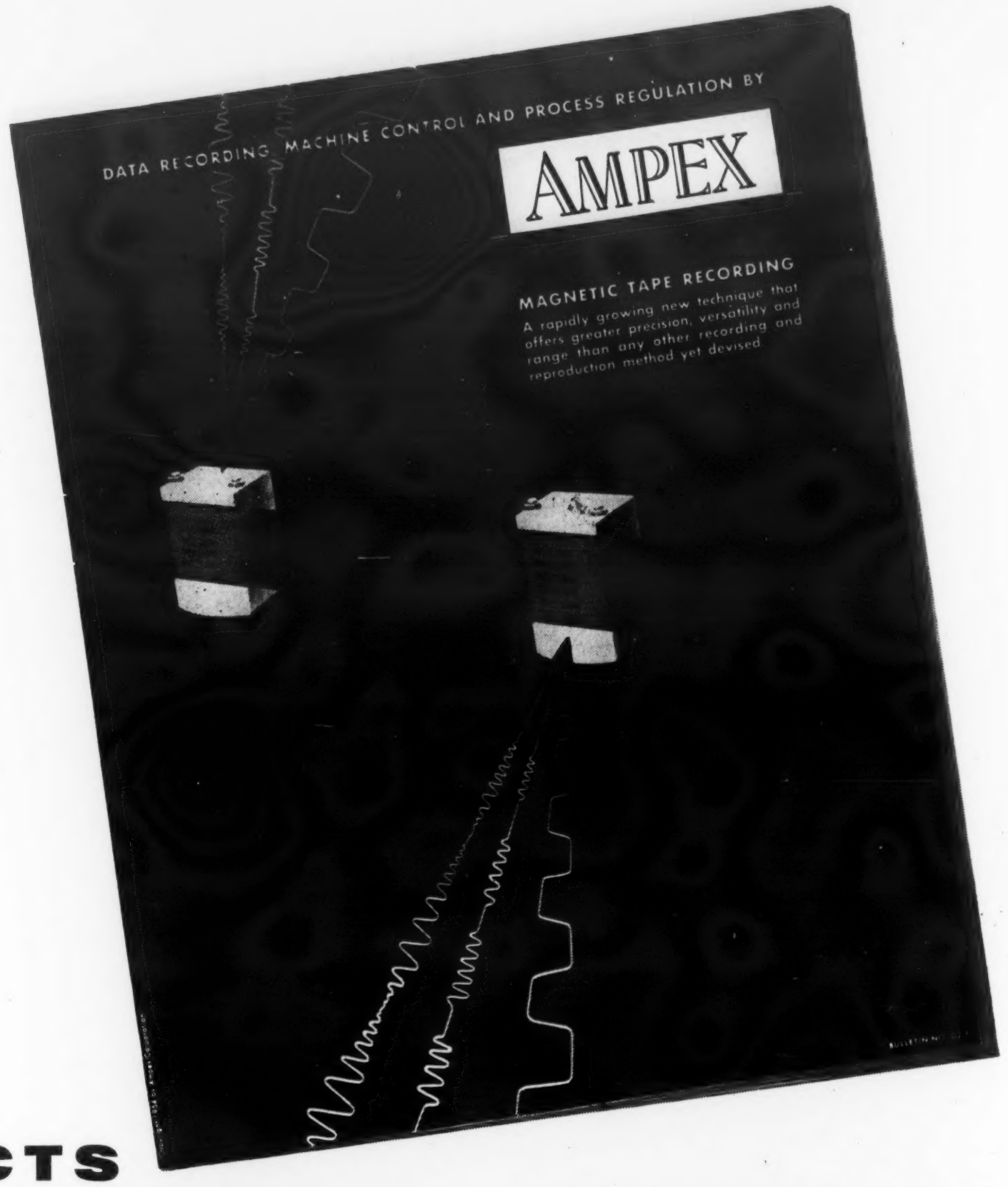
The unusually large attendance at the meeting was indicative of the interest in the RCAC tour.

San Juan

The San Juan Chapter officially received its charter on May 19th from Col. George P. Dixon, AFCA Executive Vice President, who came down from Washington for the presentation.

In presenting the charter to Capt. A. M. Patterson, temporary chapter president, Colonel Dixon complimented the chapter on its enthusiasm and growth. He then gave a comprehensive picture of the history of the association, its aims and objectives, and its present-day activities on the national as well as the chapter level. He also reviewed the highlights of the recent annual convention in Washington.

Permanent officers and directors for 1954-55 were elected as follows: president—Jose D. Dominguez, Puerto Rico Telephone Co.; vice-presidents—Frederick Wilhelm, RCA Communications; Paul A. Girard, Radio Corporation of Puerto Rico; secretary—Lt. F. Ramirez-Rodriguez, U. S. Naval Communication Station; treasurer—Jose A. Pabon, Commonwealth of Puerto Rico, Police Department. Board of Directors: W. H. Baston, CAA; A. T. Cline, Jr., FCC; Lt. Cdr. M. O. Curry, U. S. Naval Communication Station; E. W. Klein, FCC; Lt. Col. T. W. Parsons, Hq. USAR FANT & MDPR; P. M. Streit, Puerto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Rico Telephone Co.; and Fernando Vallecillo, Jr., MD.

Capt. Patterson, who is being transferred to Panama, congratulated the membership on the results of the election and expressed his thanks to his fellow officers and the various committees who had served so ably in the organizational stage of the chapter.

The meeting was held at the Officers' Club, Fort Brooke, San Juan, with a cocktail hour and dinner preceding. There were sixty-seven members and guests present.

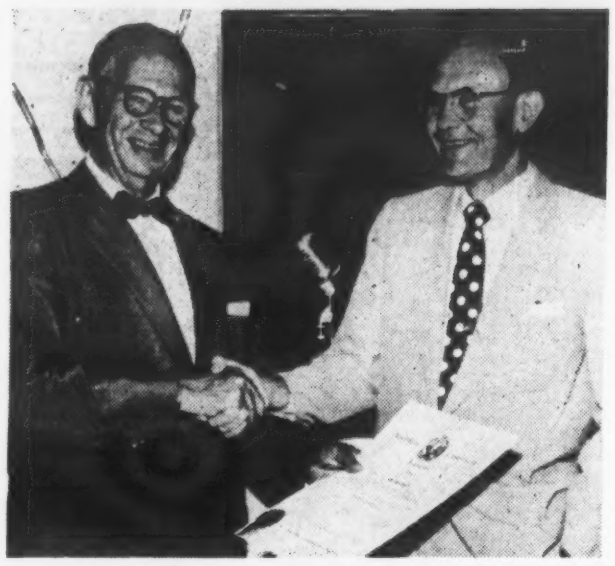
Scott-St. Louis

Chapter meetings earlier in the year featured a "TV Eye" demonstration by Michael A. Ebinger of Ebinger Radio; a talk on the reliability of airborne electronic components by Ray D. Hill, Jr., chief electronics engineer, missiles engineering division, McDonald Aircraft Company of St. Louis; and a social gathering which featured dancing and general fellowship.

Capt. Joseph J. Gallagher, head of the St. Louis Police Academy and a recognized authority on various phases of law enforcement measures against subversive activities in the United States, gave a "repeat performance" by popular request of his June 1953 talk before the chapter. Members of the chapter were guests of the Academy for this feature on May 14th.

As a sequel to his previous talk before the chapter, Capt. Gallagher spoke on some of the advanced techniques used by subversive groups. A highlight was his reading directly from actual instruction manuals of such organizations and the displaying of newspaper advertisements they have sponsored for fund raising, influencing public opinion and obtaining mailing lists. Members remained in assembly overtime to ask questions and hear further discussion. In introducing Capt. Gallagher, Allan Eisenmayer, chapter secretary, expressed the congratulations of the chapter for his promotion to Captain since his last appearance before the chapter.

During the business meeting, Col. Gomer Lewis, chapter president, reported on the events of the national convention, and stated that favorable mention had been made of the Scott-St. Louis Chapter's efforts to conduct a program to assist civil defense activities through its public emergency committee. The chairman of this vital committee, Clifford Wassall, then reported on the current plans of the committee.



San Juan Chapter charter being presented to Capt. A. M. Patterson, temporary president, by Colonel George P. Dixon.

The crowd attending the June 4th meeting called for special last minute expanded arrangements at the old Officers' Club building at Scott Air Force Base. Plans had been made for sixty persons for the dinner but over eighty showed up, with additional members coming in later for the meeting. The attraction was Major General Gordon A. Blake, Director of Communications, USAF.

General Blake's talk in the evening was a highlighting climax to a series of events starting in the afternoon. Non-Scott AFCA members were guests of Scott AFB for a tour of various base activities. The first was a briefing in the new assembly room of the Department of Radio Repairmen by Maj. William B. Simmons. Also demonstrated was a new student work kit recently developed by the training aids shops which teaches certain radio principles by means of current television circuits. When properly connected by the student, a standard television picture appears on the face of the three-inch viewing tube of one of the test instruments. This feature was followed by a tour of the department. The next visit was a briefing and demonstration by the 85th Fighter Squadron conducted by Maj. Carl W. Habeck and Capt. Edward J. Burns. The afternoon's schedule closed with a tour of the Officer's Communications School conducted by Maj. William B. Ryals.

General Blake, as he put it, was "wearing two hats," in visiting the chapter. The first was that of national first vice-president of the AFCA. As such he briefly reviewed some of the current aims and goals of the association. In wearing his "second hat" as Director of Communications, USAF, he delivered a most interesting talk on "The Impact of the Jet Engine on Military Electronics."

Prior to General Blake's talk, Col. C. I. Ferris, Wing Commander, Scott AFB, gave a brief resume of the mission of Scott AFB and welcomed the visitors to the base. Also present at the meeting were Brig. Gen. Frank H. Robinson and Col. William H. Leach of Hqs. ATRC and Col. C. E. Beasley, commander of the Technical Training Group of Scott AFB.

Officers and directors of the San Juan Chapter, seated (l to r): Lt. Col. T. W. Parsons, director; Lt. F. Ramirez-Rodriguez, secretary; Jose D. Dominquez, president; Colonel Dixon; Capt. A. M. Patterson, retiring president; Frederick Wilhelm, 1st vice pres.; Jose Pabon, treasurer; standing (l to r): LCdr. M. O. Curry, W. H. Baston, A. T. Cline, E. W. Klein, Dr. F. Vallecillo and P. M. Streit, all directors.

Seattle

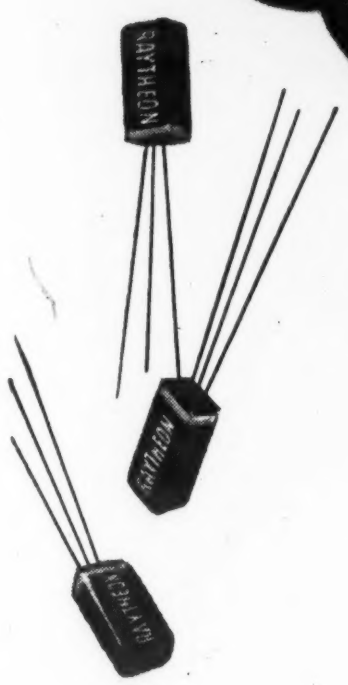
The program for the April 14th meeting was conducted by Rex Hess of the Seattle Radio Supply, Inc., who described and demonstrated two new items of radio equipment recently received by his company.

The first item was the Stewart-Warner Portafone equipment, a lightweight, portable two-way radio operating on the 465 megacycle citizens' band. It is of small size and the total weight, including batteries, is 5½ pounds so that it can easily be carried and operated by an individual in a manner similar to the "Walkie-Talkie" used by the military services. The second item shown was Sonafone marine radio-telephone equipment. This is a 4-watt, 4-channel, self-contained portable equipment operating in the 2 to 3 megacycle range. With the built-in antenna it has an operating range of 5 to 30 miles. Since it is self-contained and easily portable, it can be transferred to different marine craft without requiring any installation work.

There was a discussion of the role of communications in the local civil defense program and members were urged to take an active part in the development of such plans.

An illustrated talk on jet engines was presented at the May 12th meeting by Robert F. Boring of the aviation engineering department, General Electric Company.

Mr. Boring discussed the development of the jet engine from the earliest models through the various stages to the latest types now in use including those equipped with the "after-burner." Various models of this engine were shown in a film as well as many jet



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planes. A series of slides were also shown illustrating the engine principles and various late model jet planes. The tremendous development in power and efficiency of the jet engine in a relatively short time was emphasized throughout the program.

Southern California

An enthusiastic group of thirty people attended the reorganization meeting of the Southern California Chapter on April 20th at the Town House in Los Angeles.

Randolph C. Walker, president of Audio Products Corporation, and chairman of the reorganization committee, presided and gave a report on the activities and progress of the committee.

Rear Admiral Charles F. Horne, USN (ret.), manager of the Pomona Division, Consolidated Vultee Aircraft, was the main speaker. Formerly a director of the Washington Chapter, Admiral Horne discussed the aims and purposes of the association and described its functions and activities.

Temporary chapter officers and directors were chosen as follows: president — Richard Fuller, general manager, Pacific Division, Bendix Aviation; vice-president—Charles A. LaHar, manager, government dept., Los Angeles office, RCA; secretary-treasurer — Lester R. Daniels, Audio Products Corporation; directors—Admiral Horne; Dave Callahan, public relations manager, Gilfillan Brothers, Inc.; Randolph C. Walker; Loyd Sigmon, manager, radio station KMPC; John W. Inwood, superintendent, Western Union Telegraph Co., Los Angeles; Col. Hobart R. Yeager, Lockheed Aircraft Corporation; Lou Howard, president, Triad Transformer; and Col. Holman H. Dillard, president, Technical Development Corp.

Plans were made for regular chapter activities. For the time being, it was decided to hold evening meetings approximately every quarter and in the general vicinity of the Town House. It was also decided to have a single company or a group of several companies assume the complete program for each meeting as a special project. Lewis Imm, president of Librascope, Inc., invited the chapter for a tour and a meeting at his company's new building which will be completed in the fall.

South Texas

The chapter's second regular meeting was held on May 12th at the Kelly Air Force Base Officers Club, with civil defense the program feature.

Col. George L. Richon, chapter president, welcomed all on hand and introduced two members who had been unable to be present at the inaugural meeting: Brig. General Harold H. Bassett, commanding general, Air Forces Security Service at Kelly AFB, and Trevor H. Clark, associate director of Southwest Research Institute. He also introduced several visitors from the North Texas Chapter, one of whom. Col. T. F. Yates, reported on the activities of his chapter and extended an open invitation to attend meetings of the North Texas Chapter when in that area.

Stephen H. Simpson, Jr., gave a report on the business meetings and events of the national convention which he had attended as official chapter representative.

The chairman of the chapter's civil defense committee, Howard Davenport, briefly reviewed the civil defense program and introduced the guest speaker, Mr. Carlos Dodd, representing the five-state regional office of the Civil Defense Administration.

Mr. Dodd outlined the existing civil defense program, covering the essential services required and how such were coordinated at federal, state and community levels to allow for handling of anticipated emergencies. He emphasized the necessity of communications, outlining the part an organization like AFCA could play in the picture. He further expressed the necessity of carrying complete information and training down to the actual individual who must be aware of the part he or she must play in the program to assure its effectiveness. He described some warning systems and Howard Davenport demonstrated one of the automatic alarm systems being installed and utilized to effect announcement of alerts. The speaker re-stated the importance of participation at all levels, and expressed the desire that all concerned should be aware and make others aware of its importance.

Tinker-Oklahoma City

A tour of the facilities of the 33rd Air Division (ADC) AC&W site was the highlight of the April 30th meeting.

Members and guests first gathered in

Above, Capt. Joseph J. Gallagher, head of the St. Louis Police Academy, is shown addressing the May 14th meeting of the Scott-St. Louis Chapter.

Some of the Scott-St. Louis members and guests who enjoyed the chapter's spring dinner-dance at the Elks Club in Belleville.

Prior to the Scott-St. Louis meeting at Scott AFB on June 4th, a tour of the base was conducted for chapter members who were not affiliated with the installation. Photo shows the group assembled at the beginning of the tour.

the mess hall for dinner, after which they went to the base theater where they were divided into groups of twenty-five. Half went to the radar site and the other half visited the GCI site. The tour lasted over an hour and was of vital interest to all participants.

During the business session, a chapter constitution and by-laws was submitted by the constitution and by-laws committee and was unanimously adopted.

Station WKY and WKY-TV was host to the chapter on May 28th. A tour was conducted by personnel of the station and an opportunity was afforded the AFCA members to view some closed circuit color TV and the associated equipment. The AM and TV transmitters were also shown. WKY has a unique type antenna for AM in that it is a center loaded antenna with the top half insulated from the bottom half operating on a frequency of 930 kc.

A dinner-meeting at Beverly's Restaurant preceded the visit to the station. Al Woods, chapter secretary, gave a detailed report on the national convention at which he had represented the chapter.

At a meeting of the board of directors and the executive committee on June 3rd, the following items of business were transacted:

Maj. Wellsford V. Barlow, 1800 AACS Wing, was appointed chapter secretary to succeed Al Woods who was being transferred to Amarillo, Texas. Col. Lewis G. Young of the 33rd Air Division was appointed to the vacancy created on the board of directors by the transfer of Maj. James H. Terrell.

In view of the special emphasis placed on civil defense at the national convention, a chapter civil defense committee was set up with James F. Nichols of Southwestern Bell as chairman and Delbert Craven, also of Southwestern Bell, as his assistant. Plans were then made to devote a chapter meeting to the civil defense program in the near future.

Washington

The chapter's annual election in May brought the following slate into office for 1954-55: president—Frank W. Wozencraft, attorney, and national counsel of the AFCA; vice-presidents—Maj. Gen. F. H. Lanahan, USA; Rear Adm. F. R. Furth, USN; Brig. Gen. A. L. Pachynski, USAF; and John F. Gilbarte, Admiral Corporation; member, executive committee—Thomas B. Jacocks, retiring president; secretary-treasurer—M. C. Richmond, Western Electric Co., Inc.; general counsel—Ralph L. Walker, partner in law firm of Pierson & Ball.

Board of Directors: Capt. Rawson Bennett, USN; Col. Melvin G. Brown, USMC; Percy G. Black, Automatic Electric Co.; Brig. Gen. Victor A. Conrad, USA; Brig. Gen. W. P. Corderman, USA; Rear Adm. Kenneth K. Cowart, USCG; Francis Colt DeWolf, State Department; R. S. Drake, Hoffman Labs, Inc.; Francis Engel, RCA Victor Div.; Col. Charles W. Gordon, USAF; J. F. Hanlon, Westinghouse Electric Co.; W. J. McManus, Chesapeake & Potomac Telephone Co.; Thomas Meloy, Melpar, Inc.; George Sheets, Stromberg Carlson Co.; Col. C. S. Stodter, USA.

Having distinguished itself as host to the 1954 national convention, the Washington Chapter is now resting on its laurels until the fall when it will resume a schedule of regular meetings.

Tinker-Oklahoma City Chapter officers. Front row (l to r): Brig. Gen. Thomas L. Bryan, president; James J. Nichols, 1st vice pres.; Lt. Col. Pete Christiansen, 3rd vice pres. Back row (l to r): Frank Rohrer, 2nd vice pres.; Carl Klepzig, treasurer, and A. L. Woods, secretary.

Student Chapters

Norwich University

Official presentation of the chapter charter was made on April 28th by Raymond B. Meader, president of the Boston Chapter, who went up to Norwich for the occasion. In making the presentation, Mr. Meader reviewed the aims and objectives of the AFCA and complimented the officers and members of the Norwich University Chapter for their contribution to the overall effectiveness of the association.

Mr. Meader also gave a talk on the subject of color television which proved to be of much interest to the members and guests.

A chapter banquet concluded activities for the school term. Election of officers for 1954-55 were held with Wilbur Edel chosen as the new president. The other officers were re-elected as follows: vice-president—Alfred Ward; secretary—William Altman; treasurer —Donald Douglass.

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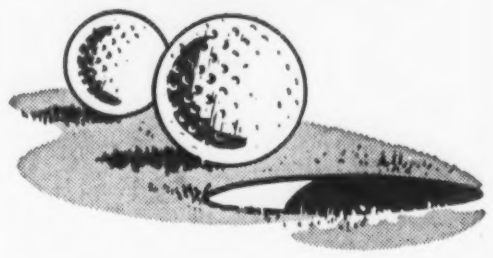

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NEWS

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MAGNETIC DRUM WILL GUIDE PLANES

A magnetic drum with the memory of an elephant—and the ability to ferret out filed information in split seconds—will help guide airplanes safely along the crowded airways of the future.

This safety equipment was developed by the Engineering Research Associates Division of Remington Rand, Inc. under a contract with the Federal Air Navigation Development Board.

Electronic display boards will also provide control towers with instantaneous and easily absorbed information as to the exact position of each airplane in a given area.

The drum can hold and store 2,000 different messages — flight plans, weather reports, any data about which the mechanical-brain computer may receive a query.

On the receipt of a query the drum would search through the 2,000 flight plans, prepare a reply and have it ready to send out—all in a half second. The reply message would move back to the inquiring station at the usual teletypewriter rate, 75 words a minute.

Navy Develops Balloon-Borne Weather Station

The Navy has recently announced the development, on an experimental basis, of a balloon-borne weather station which will permit collection of meteorological data on a global basis.

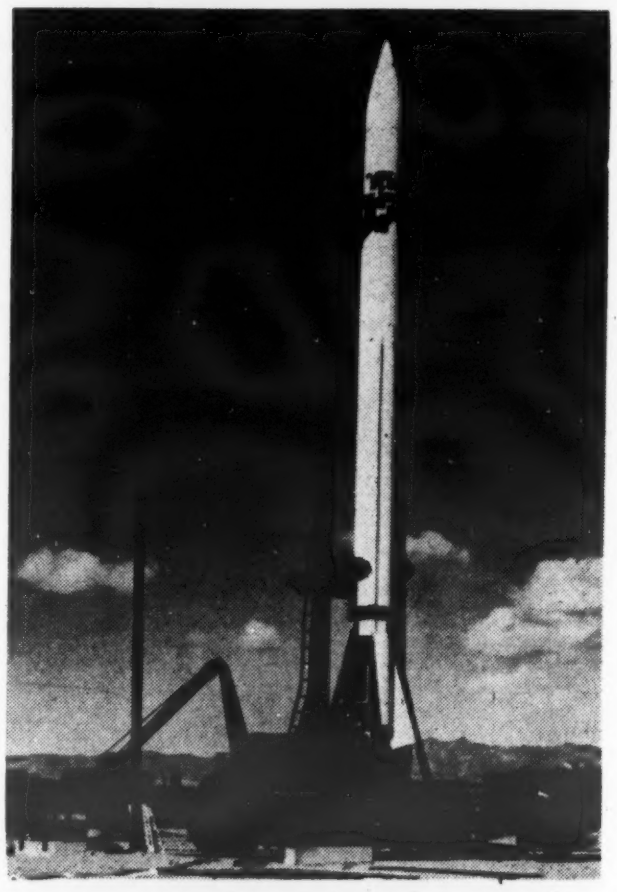
The new system has been named the "transosonde," for "transocean sounding" system. It was developed by the Navy to obtain necessary weather information over areas which had previously been considered inaccessible, and specifically over vast ocean areas where no organized data collection has before been possible.

As described in a paper by H. J. Mastenbrook and A. D. Anderson of the Naval Research Laboratory, the transosonde system includes a plastic balloon, 39 feet in diameter, which carries the necessary weather instruments, including radio transmitting devices, supplemented by a network of landbased radio direction-finder stations to track the balloons and also to receive meteorological data periodically from airborne instruments.

Flight tests in 1953, across the United States from west to east, and across the Atlantic Ocean to the coast of Europe, successfully demonstrated the feasibility of the system. Additional flights are now being planned for the Atlantic and Pacific Ocean areas, with the ultimate goal of putting the system on a operational basis.

In addition to securing conventional weather data, the transosonde system offers a potential means for furnishing data not presently available to the meteorologist. Such information is of increasing importance from the military standpoint with the advent of long-range air operations involving both propeller-driven and jet aircraft.

The Honest John, U. S. Army's free flight artillery rocket, shown taking off from test-type launchers at White Sands Proving Ground, New Mexico. It consists of a rocket and a highly mobile, self-propelled launcher. The rocket itself comprises a forward compartment which houses the warhead, a motor at the center, in which the rocket propellant is fitted, and a fin assembly at the rear.



U. S. Army's Corporal, surface-to-surface guided missile, shown being elevated to erect position by its tactical transporter-erector preparatory to firing. This weapon gives the field commander far greater firepower on the battlefield and enables him to strike selected targets deep in the enemy rear areas.

The Sperry "Sparrow I"

The advanced status of a Navy air-to-air guided missile system, the supersonic "Sparrow I," has been recently announced by the Department of Defense. Training of ship and shore personnel is currently underway for use of this weapon by carrier-based jet aircraft of both Atlantic and Pacific fleets.

Only partial disclosures on the "Sparrow" missile have been made by the Navy Bureau of Aeronautics and Sperry Gyroscope Company after seven years of development.

The Sperry Sparrow is rocket powered and fully maneuverable at supersonic speeds, yet light and compact enough to be carried in multiple units by fighter-type jet aircraft. Exact weight, range, type of warhead and performance data are still classified.

Prime responsibility for development and manufacture of the complete system was assigned to Sperry Gyroscope Company by the Bureau of Aeronautics, from the earliest concept of the job as Project HOT SHOT in 1947.

ELECTRODYNAMIC PHONOGRAPH

A new phonograph pick-up of the true electrodynamic type, designed for high-fidelity sound systems, has been introduced by Electro-Sonic Laboratories, Inc. of Long Island, New York.

The output is flat from 20 to 10,000 cycles and has a slight rising characteristic to 20,000 cycles, depending on the record material.

The pick-up is built like a D'Arsonval meter movement. A tiny loop of

the fine wire, wound on a Permalloy armature, is mounted between the pole pieces of a small but powerful Alnico magnet. To one end of the supporting shaft is attached a light arm about 3/16 inch long, the free end of which holds a sapphire or diamond stylus.

As the stylus rides the grooves of the phonograph record, it moves from side to side, causing the armature to move radically within the field of the magnet. The varying voltage induced in the coil is a faithful electrical equivalent of the original sound impressed on the record.

The output of the pick-up is perfectly flat because the armature turns in a uniform magnetic field. Spurious responses due to resonance effects and other causes are completely absent below 20,000 cycles.

NATIONAL PNEUMATIC ANNOUNCES NEW MOTOR-GENERATOR SET

National Pneumatic Co., Inc. and Holtzer-Cabot Divisions, Boston, Mass., announce the introduction of a new five frequency motor-generator set capable of generating harmonic, synchromonic or decimonic series of frequencies, with an output of 15 watts for each of the basic frequencies.

The generators used are of the permanent type and cannot be demagnetized by short-circuits or disassembly. No insulating transformers are required. The unit is cog-belt driven by synchronous AC motors and governor-controlled DC motors to ensure precise frequency regulation.

The panel is furnished completely assembled and drilled for mounting on standard 19" relay racks and may be furnished for other size racks. Each set can be supplied with a dial tone generator and interrupters if required. This unit was designed to meet the requirements of rural telephone companies for a low cost ringing machine.

Page Communications Engineers, Inc. Formed in Washington, D. C.

The formation of a new company has recently been announced by Esterly C. Page, President of the newly organized Page Communications Engineers, Inc. of Washington, D. C.

The corporation has been formed to take over the design, procurement, construction, installation, testing and operation of radio communications plants and equipment in the United States and foreign countries.

(*Continued on page* 64)

ANOTHER EXAMPLE OF Waterman PIONEERING...

The S-6-A BROAD BAND Scope is a PULSESCOPE in performance, POCKETSCOPE in size, and it compares more than favorably with oscilloscopes that are *transportable*, instead of portable. The instrument measures DC as well as AC signals. Unique DC calibration methods permit rapid measurements of either positive or negative AC or DC signals. The scope uses a 3XP1 tube with 1500 volts on the second anode, thus providing a brilliant trace for high speed transients even at low repetition rates. Vertical amplifier sensitivity of 0.2v rms/inch, and response to 5 mc within 3DB . . . pulse rise time of 0.1 μs . . . internal intensity markers from 1 to 1000 μs . . . repetitive or trigger sweep from 5 cycles to 500 KC with 5X sweep expansion . . . sweep, marker and DC calibrating voltage available externally. Size 8½ x 6¾ x 13¾ in. Weight 22 lbs. Operates from 50 to 400 cycles at 115 volts AC.

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S-14-B WIDE BAND POCKETSCOPE
S-15-A TWIN TUBE POCKETSCOPE
RAYONIC® Cathode Ray Tubes
and Other Associated Equipment

New Battery Is Powered By Sun

Bell Telephone Laboratories scientists have recently demonstrated a small solar battery which converts useful amounts of the sun's radiation directly and efficiently into electricity.

The new device, the first of its kind, is a simple-looking apparatus made of strips of silicon, a principal ingredient of common sand. With this battery, Bell scientists have harnessed enough of the sun's rays to power the transmission of voices over telephone wires.

Beams of sunlight have also provided electricity for a transistor in a radio transmitter.

The experimental solar battery uses strips of wafer-thin silicon about the size of a razor blade. These strips are extremely sensitive to light and can be electrically linked together to deliver power from the sun at the rate of 50 watts a square yard of surface.

The battery has no moving parts and nothing is destroyed in the process of getting electrons to move, so the battery should last indefinitely.

Although the battery has an efficiency equal to most gasoline and steam machines—about 6 per cent—and is theoretically capable of 22 per cent efficiency, Bell scientists acknowledge that large-scale power use would be presently impracticable. It is estimated, for instance, that 1/8 of an acre would be needed for a battery to provide electricity for a small home.

Immediate use in communications is foreseen, however, where low power is sufficient. Tacked to telephone poles the solar batteries could power a telephone system and charge storage batteries to provide power at night.

Motorola Introduces New Line of Two-Way Radios

Motorola Communications and Electronics, Inc., has announced a new line of 144-174 mc., 10 and 25 watt FM mobile two-way radios known as the Universal Uni-Channel Series. The new models operate interchangeably from either 6 or 12 volt automotive electrical systems without any circuit modification whatsoever and feature a patented long-life, dual-interrupter all vibrator power supply for operation of both the transmitter and receiver circuits.

The universal 6/12 volt feature incorporated in these new models is of paramount importance in view of the continuing trend in automotive design from 6 volts to the more efficient 12 volt electrical systems.

This feature permits greater flexibility in the operation of radio equipped fleets having vehicles with both 6 and 12 volt systems since mobile units may be interchanged indiscriminately without regard to the type of vehicle. The power cable kits permanently installed in the vehicles differ with the battery voltage so that, in effect, automatic switching occurs when the unit is transferred from one vehicle to another.

Models are available for under-the-dash mounting with local controls and for trunk-mount installation with the microphone, control head and speaker installed near the driver. Both units are 6 inches high, 9⅞ inches wide and 18¼ inches long, a volume about two-thirds that of units of comparable power.

The above graduates of the U. S. Military Academy, Class of '54, having chosen the Signal Corps, will report to Fort Monmouth for training. Left to right, 1st row: R. A. Griffenhagen, J. E. Thomas, Y. D. Weatherby, W. V. Paul, S. A. Lasher, H. Prescott, F. Kersh, J. F. Obendorfer. 2nd row: W. J. Almon, J. H. Martin, G. A. Lacour, J. R. LeMere, J. M. Stark, L. E. Wilner, E. R. Evans, E. M. Aguanno. 3rd row: W. J. Hilsman, M. D. Drake, C. E. Miller, P. L. Studt, P. C. Bunevich, R. B. Lee, W. J. Ovberg. 4th row: O. W. Beleville, G. H. Storck, A. S. Milder, H. W. Butler, M. C. Jones, J. V. Craig, J. E. Marcus. 5th row: R. A. Ironside, L. J. Bahin, J. G. Moore.

Armed Forces Management Technicians Association Organized

Formal organization of the Armed Forces Management Technicians Association was recently completed with the adoption of bylaws and the election of a Board of Directors at a meeting held in Fort Myer, Virginia.

James M. Mitchell, Deputy Assistant Secretary of Defense for Manpower and Personnel, was elected Chairman of the Board.

The association is an organization of military and civilian personnel engaged in the various facets of management work in all of the Departments of the Defense Establishment. Membership includes Army, Navy, Air Force, Marine Corps and Office of Secretary of Defense personnel.

These members have joined together, aware of the vital importance of management to national defense, to promote cooperation in the interchange of highly specialized techniques and knowledge required for the continuance of improved management methods.

This association is not an official instrumentality of the government and is politically nonpartisan. It does, however, have the sanction of top military and civilian heads of the various defense agencies.

New Battery Operated Radio Unit

Personnel traveling in remote areas can take their phone with them more easily as the portable communication units become lighter and lighter. "Minipak," a product of Radio Specialty Manufacturing Co. of Portland, Oreg., is the new battery operated FM radio unit with the weight trimmed down to a mere 8 pounds complete with batteries and 2 channel transmitter-receiver. The new "Minipak" unit has been designed and engineered for forestry people, construction crews, survey parties or any organization needing extremely light weight but reliable communication equipment. "Minipak's" batteries have a normal operating life of over 8 hours.

The unit is supplied with a zipper carrying case and a packstrap. The removable whip antenna folds up into the carrying case.

Lest you Forget—
we'll start reminding you now that the 9th Annual AFCA Convention will be held in May, 1955 in New York City.

Triad Introduces New Amplifier Kit

Four new Amplifier Kits for high fidelity reproduction are introduced in the 1954 Catalog of Triad Transformer Corporation, Venice, California.

The kits cover the range from 10 watts to 40 watts with the HF-12 delivering 10 watts output, HF-18 "Williamson" type all Triode Amplifier delivering 16.5 watts, and the HF-40 Auditorium Amplifier delivering 40-55 watts. A Preamplifier featuring a complete record equalizer and new tone control, designated HF-3, is also provided as a kit.

Kits include all necessary transformers, chokes, sectional chassis and complete instructions for assembly, including photographs, drawings and decals.

SIGNAL CORPS OFFICERS PROMOTED

The Senate has approved the promotions of three Signal Corps officers, all members of the AFCA.

Brig. Gen. Rex Van Corput has been promoted to the temporary rank of Major General, and Colonels Samuel Pickens Collins and Frank Willoughby Moorman have been promoted to the temporary rank of Brigadier General.

General Corput is Director of Communications and Electronics for the Joint Chiefs of Staff, Department of Defense. Before taking over his present assignment, General Corput was Signal Officer for the European Command with Headquarters in Germany.

General Collins began his army career in 1926 and is now Chief of the Personnel and Training Division of the Office of the Chief Signal Officer.

General Moorman, prior to taking his present assignment as Secretary to the General Staff, U. S. Army, was assigned to SHAPE with headquarters in Paris, France.

RAYMOND "SCRATCH" RECORDER

The Raymond Engineering Laboratory, Inc., of Middletown, Connecticut has developed a device to provide a relatively non-destructable record which could be recovered after tests of bombs, torpedoes and guided missiles to confirm the actual time sequence which had occurred.

The "scratch" recorder is a 3 inch diameter blued aluminum disc onto whose surface arcs are scribed. A clock mechanism starts to rotate the disc when initiated by a suitable electric pulse. Five radially-positioned scribers are projected up to engage the disc surface as electrical pulses from various desired sources are applied to explosive squibs. The length of the arcs scribed at the different diameters measure the time sequence.

IRC Introduces New Miniature Resistor

A new ¼ watt high frequency miniature resistor, known as type HFR, has been introduced by International Resistance Company, Philadelphia. Constructed of special, solid ceramic rods to which a thin resistive film is permanently bonded, this unit, featuring axial leads, meets specification MIL-R-10683A. The entire body assembly, including lead "caps," is coated with a moisture resistant protective coating. Especially designed for high frequency applications, this unit is recommended for use in circuits requiring excellent frequency response over a wide band of frequencies and any application where low shunt capacity is desirable.

Medicine and Electronics

Several advances in the field of medicine have taken place recently in connection with newly developed electronic devices.

A new electronic clinical thermometer which gives an accurate temperature reading in five to seven seconds, less time than it takes to "shake down" the mercury in the conventional glass rod type, was demonstrated recently at the Army Medical Service Graduate School in Washington, D. C.

Its inventor is Colonel George T. Perkins, an Army dentist with an interest in radio and electronics.

The device is powered by a mercury cell battery which operates over a wide temperature range and is unaffected by humidity. It is believed that the battery will provide 750 hours of operation before replacement is required.

Connecting the battery case with the sensing unit or probe is a transmission cord the length of which does not affect the sensitivity or accuracy of the instrument. This makes it possible for a nurse to remain at her ward desk and take a patient's temperature in another part of the ward.

Another example of electronics in medicine is a new air cleaner using static electricity developed recently by Raytheon Manufacturing Company of Waltham, Massachusetts.

This new device, providing filtered air for allergy sufferers, quickly rids the air of smoke, pollen, dust, lint and even many types of germs by trapping them in the electrically charged parts of the machine's filtering unit.

The "Micronaire" cleaner uses approximately the same amount of current as a 40-watt electric light bulb. Its construction is simple and easy to service. Air is drawn into the machine by a motor-driven fan, and is passed over a series of metal plates which are closely spaced. Every other plate is electrically charged with the static force that makes the plate act as a magnet for dust and other impurities in the air. As the air rushes along between the plates, the airborne particles are attracted to the plates and cling there.

Production of the device has begun and is expected to reach mass volume by early Fall.

A new type of electron microscope, twice as powerful as any now in use, has recently been displayed by the Radio Corporation of America.

The new microscope will permit study of particles smaller than one 10-millionth of an inch in diameter. Photographs taken by an automatic camera contained in the instrument can be enlarged up to 200,000 times the size of the specimen—a scale at which an ordinary dime would measure more than two miles across.

There is hope that analyses by electron microscopes will lead to discoveries which may provide a better understanding of the cancer disease.

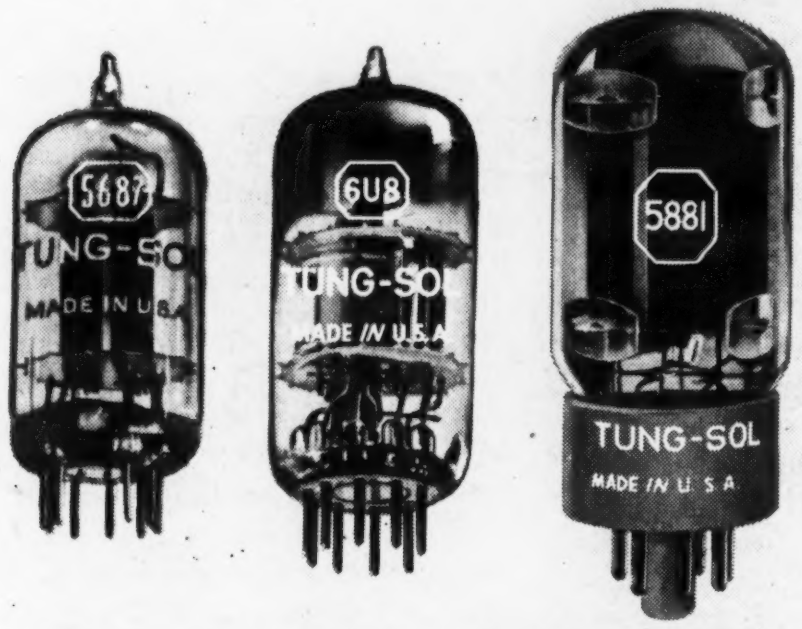
The key part of the microscope is a vacuum column that includes the electron gun, four magnetic lenses and viewing chambers that enable three persons to see the magnified specimen at the same time.

Another important example of advancement in medical equipment brought about by electronics is an instrument which electronically and automatically detects changes in the physiological condition of a patient under anesthesia throughout the course of an operation.

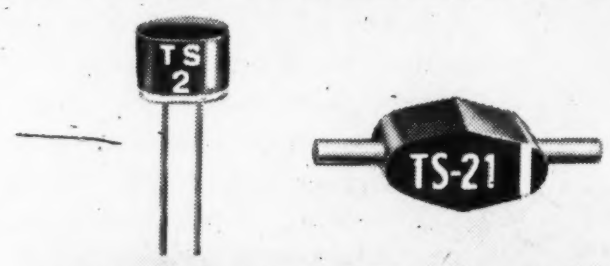
Developed by the National Bureau of Standards, this instrument measures changes in the patient's blood pressure, heart beat, and respiration as they occur and presents the data on a panel for interpretation by the surgeon or anesthesiologist.

Data on blood pressure, pulse rate and pulse irregularity, breathing rate, and amount of air breathed out per minute are available at a glance without intermediate calculation or manipulation. Preliminary adjustments are easily made, requiring no special technical skill or training on the part of the operator.

PICTURE TUBES



RADIO, TV, SPECIAL PURPOSE TUBES



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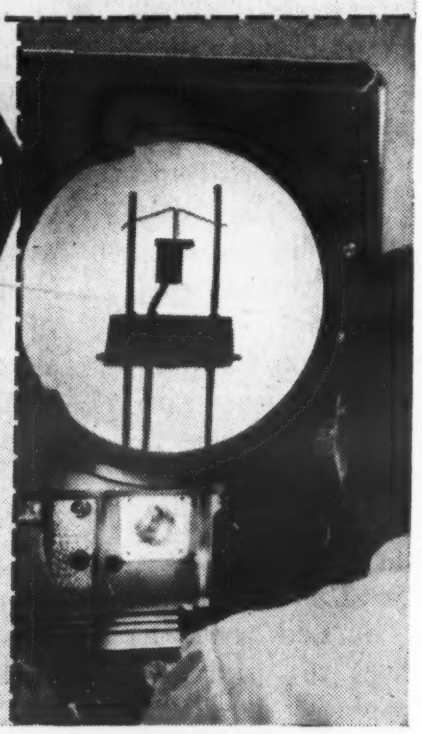

AFCA Members Available to Industry

In this new feature of SIGNAL, we open the pages of our AFCA journal to the *members* of the Association who are seeking positions in the communications, electronics or photographic industries. Any member is entitled to space free of charge in this column. Please limit your entry to five lines.

RESERVE COMMANDER, now active duty. Aeronautical communications electronics specialist. Airline and CAA background. Private pilot. Managerial or company representative type work preferred. Box 101, SIGNAL.

REPRESENTATIVE for electronic manufacturer seeks new position as representative for small firm to Navy, Signal Corps and Air Force. Excellent background in government contact and commercial sales. Box 102, SIGNAL.

PERSONNEL & labor relations manager, supervisor, operational administrator; twelve years progressively responsible military and civilian experience. Extensive background in training procedures and communications equipment. Degree supplemented by advanced technical training. Prefer location in southwest. Box 103, SIGNAL.

Government Position Available

The Corps of Engineers' Research and Development Laboratories, located 20 miles south of Washington, D. C. at Fort Belvoir, Virginia, need several specialists in the field of electric power generation. Applicants must hold a degree in electrical engineering or have considerable practical experience in their field. Apply to Mr. Walter H. Spinks, Chief, Administrative Dept., ERDL, Ft. Belvoir, Va.

Communications in Defense

(*Continued from page* 20)

allow financial prosperity to the country's communication utilities.

We must be sure we take proper steps so that our communication facilities will not be sabotaged in case of a sudden enemy attack.

We are living in a vastly troubled world. As never before the lines are being drawn between those who choose to live only as free men and those who would turn the world into a slave labor camp. You and I have much more responsibility in this battle for freedom than do most of our fellow citizens. In our hands and in the hands of our associates is the responsibility for the vast communication systems which, in my opinion, are one of our nation's most precious assets. If the freedom of our children and of the generation yet to come is to be assured, we must do our jobs up to the hilt.

I hope you will pardon here a personal expression. I have been a communications man for more years than I sometimes like to remember. I have known communications men and women of every part of the country and every part of the industry. I think I need not tell you that in my opinion they are the finest people in the world. They have many wonderful characteristics but there are two that are always in evidence. The first is their pride in themselves and the job they do. The second is their independence which is just another way of saying their love of freedom. And I think I can say to our friends in the military services that when the chips are down and they are fighting the great battle for the freedom of the world (which God forbid need ever be done) they can count fully on the men and women of the communications industry. We know our jobs and we mean to do them. We were never meant to live on our knees and when the time comes we will be ready to prove it.

My friends, God has set our country in this world to carry the shining light of freedom. It is not His purpose that this light shall fail. He has placed in our hands a grave responsibility for an important contribution to His plan. We never have failed and we never will.

- - - — - —

"Gunner to Pilot . . . two fighters . . . turning in!"

No TIME to repeat this message. He must get every word right the first time.

In today's higher-speed, higher-altitude bombers, crewmen must quickly grasp every code-word passed. Speed of intercommunication has to keep pace with speed of operation.

Working since 1947, RCA engineers have developed the AN/AIC-10—an intercom system which meets Air Force requirements for high intelligibility under conditions of extreme noise and altitude. RCA noise-discriminating microphones have two faces which "balance out" extraneous noises, transmit sounds *only* from the speaker's mouth. Unique filter, amplifier and automatic volume control circuits reduce the effect of extraneous noise. Altitude-compensating headsets maintain sea-level sensitivity at 40,000 feet or more—and give crews maximum head comfort.

Now in full production, the AN/AIC-10 is but one of many complete electronic systems RCA has developed for the Armed Forces. RCA engineering —from original planning to final production— assures greater efficiency, effectiveness and safety in operation.

300,000 Spotters Wanted. Men, women volunteers for Ground Observer Corps to help the Air Forces search for hostile aircraft, man Air Defense filter centers, do many Air Defense team jobs. 200,000 patriotic Americans are now serving. Contact your local Air Force Office.

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GOVERNMENT DEPARTMENT
RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DIVISION
CAMDEN, N.J.

TELEVISION

WINSTON INTRODUCES COLOR TELEVISION PATTERN GENERATOR

Winston Electronics, Inc., of Philadelphia, has recently introduced a color television pattern generator which will produce from one to eight visible rainbows of color on the face of a color television kinescope.

The individual colors making up the rainbow may be identified for use in testing and alignment of color television receivers.

This instrument, known as the model 150 Rainbow Generator, has the dual function of serving both as a color television demonstrator for the sales department and a servicing tool for color TV alignment and troubleshooting.

The generator provides modulated RF output on channels 2 to 6, or chroma signal output at the same output terminals. Controls include channel tuning and color selector.

Service applications include the adjustment of the reference oscillator, the master phase control and the color demodulator phases, matrixing and chroma circuit gains. The unit may be used to isolate chroma trouble or to test and align chrome circuits. It is equally suited for either the I/Q or the (R-Y) (B-Y) system.

300TH NETWORK TV STATION LINKED TO BELL SYSTEM

A milestone in the six-year history of commercial network television service was reached recently when WKNY-TV, Kingston, New York was linked to the Bell System's nationwide network of television facilities.

This interconnection will make the 300th network television station being served by the Bell facilities and will bring the number of cities serviced by network television to 191. More than 54,000 channel miles of coaxial cable and radio relay facilities are being used to provide network TV service.

About 380 television stations are now on the air in the United States, located in about 250 cities, and broadcasting to an estimated potential audience of 109,000.

It has been estimated by the Long Lines Department of the American Telephone and Telegraph Company that before this year is over, about 60 more stations will be connected to network facilities.

ADMIRAL HOLDS COLOR TV CLASSES

A training school, in which the passing requirement is the ability to repair a color television receiver, is being held in Chicago by the Admiral Corporation.

It is the third color television training school conducted for Admiral field engineers and distributor service engineers.

The instruction consists of ten days of lectures on the technical aspects of color receiver circuitry and transmission, followed by laboratory work on color receivers with test equipment. The textbook being used is "Introduction to Color Television," written by Admiral Corporation color engineers.

Before the field and distributor service engineers came to Chicago to attend the school they were given a written examination by mail consisting of 30 questions and a color perception test.

As a final requirement of the course, each man must be able to repair a color television set. After completing the course the engineers return to their home cities to train dealer service personnel and outside service men.

Du Mont Outlines Station Planning For Color Television

The Allen B. Du Mont Laboratories, Inc., pioneers in monochrome and color television equipment, have recently published a booklet entitled "Station Planning for Color Television."

This booklet outlines four color television complements as steps recommended by Du Mont for the conversion of a station's monochrome television operations to handle a color signal.

These four steps are as follows:

1. Complement A: Test and rebroadcast facilities for handling color program from network source.
2. Complement B: Additional equipment to provide origination of local test signal.
3. Complement C: Additional color Multi-Scanner equipment for reproduction of color slides.
4. Complement D: Additional color Multi-Scanner equipment for reproduction of color film.

The cost of the added dimension of live color television pickup systems for at least 90% of the television stations existing in the United States will, for some time to come, be prohibitive from the viewpoint of initial purchase, operational and maintenance costs, and program standards.

Because of the inherent difficulties of proper registration of three color signals in experimental three-tube cameras, Du Mont recommends the new Du Mont Color Multi-Scanner (SIGNAL, March-April, 1954) for monochrome or color slide and film pickup during the average station's initial conversion to color origination.

Du Mont suggests that the smaller station convert its monochrome facilities to color by the four steps listed above. As station revenue increases, or as the market becomes more saturated with color television receivers, the broadcaster can move on to the next step. By using this cumulative method of expansion, the television broadcaster can absorb the additional costs of color television equipment over a period of time. Thus the initial conversion is inexpensive and the viewing public is presented with color telecasts immediately.

RCA Announces New Test Equipment For Color Television

Development of three types of electronic test equipment essential to installation and maintenance of home color television receivers has been announced recently by RCA.

The equipment, which is now commercially available, includes:

1. The industry's first service-type color-bar generator (RCA WR-61A), which produces on a receiver screen a multiple-color test pattern of ten color bars for adjusting color phasing and matrixing circuits.
2. The first portable dot-bar generator (RCA WR-36A), designed specifically for making all convergence adjustments in the color receiver.
3. A five-inch dual-band width oscilloscope (RCA WO-78A), for observing the color-burst circuit.

The instruments were developed jointly by the Tube Division, the RCA Service Company, and the RCA Home Instrument Division, and incorporate features to meet the special needs of service technicians, design engineers, color set manufacturers.

Dr. Allen B. Du Mont said in the early days of television, "Who wants to look at the world through a knothole?"

It was Du Mont's vision that took television *out* of the knothole class.

Even before the first set was produced . . . he was planning *big* screens. The Allen B. Du Mont Laboratories made large-screen television from their very first set!

Now, once again, Du Mont has taken television out of the knothole class . . . This time it's *color* television! Long before the public became "color conscious", Du Mont research was working to bring you *big screen* color television.

Du Mont has consistently refused to settle for small screens. Now . . . with the development of a nineteen inch color picture tube . . . Du Mont makes possible color pictures of more than twice the size of any yet offered to the public, and hastens the day when color sets will be available at a reasonable price.

Proof again that it is to Du Mont that the public and the industry alike can look for the vision so necessary to progress in the telectronic age . . .

VISION IS THE DU MONT® DIMENSION

First with the Finest in Television
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Allen B. Du Mont Laboratories, Inc. Home Office: 760 Bloomfield Avenue, Clifton, New Jersey

Radio Military Amateurs

MARS Chief Returns to Civilian Life

Major James A. Long, former Chief, MARS-Army, returned to civilian life on June 25th. During his tour with MARS, many changes and improvements in the program were accomplished.

Major Long has entered the marine and mobile radio business under the name of Jim's Radio Service in Silver Spring, Maryland.

Military and Civilians Form Mars Network

Organized to stimulate interest in the amateur radio field the Military Affiliate Radio System MARS in Hawaii now stands ready to serve in any emergency.

MARS Hawaii, functions as a secondary world-wide radio net ready to aid military commanders, Red Cross representatives and other officials charged with emergency responsibilities during any crisis.

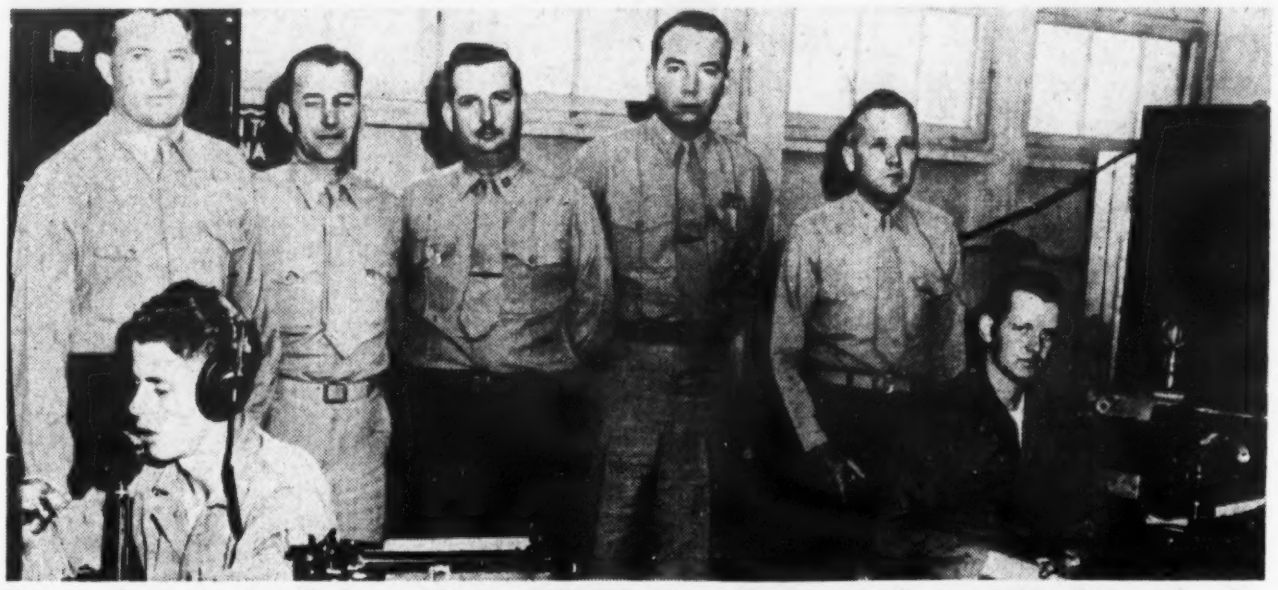
In the U.S. Army, Pacific area alone there are 87 stations, including those as far west as Yap in the Carolines, manned by soldier and civilian "hams" of the MARS training network.

Main traffic handled by the local network is that for the Red Cross which averages some five messages a day. Also high on the list are Army Special Services and Chaplain messages.

The goal of MARS, USARPAC, is to establish stations in every military area; similar stations on every island, district, and locality; and the coordination of all these stations into networks as part of an integrated system.

Primary utilization of the Hawaii network is the moving of messages to the mainland and acting as a clearing house for messages coming in from the Far East.

Now being organized on a large scale locally as a "potential in the event of disaster" are the mobile amateurs of Honolulu. These consist of MARS members with radio equipment in their cars which operate on a fixed frequency.



Shown above is the El Toro Marine W6FCS Ham Station. Left to right: Sgt. John H. Gilson, WØLDX; Captain W. D. Collup, W9VCT; Major Robert H. Fore, K6DJK; Captain Zane E. Sprague, W6UWL; Maj. T. H. Miller, K6DKI, and Lt. Col. Carl O. Wyman, K6EAC.

In addition to the moving of messages and mobile radio transmission, MARS has set up a code course for both civilian and military personnel at its station located at Fort Shafter, Hawaii.

More than 280 applications were received for the free course. Of the 280 only 20 could be accepted because of the space limitations. At the end of the course, students will be urged to take F.C.C.'s exam for a third class radio operators license.

AMATEUR RADIO AT EL TORO

Lt. Col. Carl O. Wyman, USMC K6EAC and ex-NN7IC, Communications Officer at the El Toro, Marine Corps Air Station, Santa Ana, Calif., recently took over as licensee of station W6FCS at El Toro. Col. Wyman, of NN7IC fame, has succeded in building up the interest in amateur radio among the personnel of the station.

W6FCS is working a daily schedule with the First Marine Air Wing amateur station DA4MA in Itami, Japan on 20 meters with single side band equipment. Sgt. Arthur B. Septon Jr., W7SLG, and Sgt. John H. Gilson, WØLDX, handle on the average of 15 to 20 telephone patches daily. The patches handled are from men of the First Wing talking to their wives and sweethearts back in the states. They also handle on the average of 30 personal messages daily.

Other amateur operators who have recently shown interest in amateur radio are Major T. H. Miller K6DKI, ex-W5IKD, ex-W4TQK, ex-KH6OD, the station Special Services Officer; Major Robert H. Fore, USMC, K6DJK, Operations Officer here has his set on from his home in Newport Beach, Calif.; Capt. Zane E. Sprague, USMC, W6UWL, ex-KH6AWJ, ex-W6YKL/KA4, Electronics Officer for Marine Air Group 25, and Capt. W. D. Collup, W9VCT, Marine Air Control Group 3 Communications Officer, both old timers in amateur radio.

Besides the officers quite a few enlisted men have shown interest in amateur radio and it is expected that a novice class may be started in the near future.

ARRL HOLDS FIELD DAY

Thousands of radio amateurs throughout the United States and Canada moved out into fields and atop mountains for a twenty-four hour test of emergency equipment as the American Radio Relay League, national association of amateur radio operators, held its eighteenth annual Field Day, June 20-21.

This test followed closely the nation-wide civil defense test, "Operation Alert", which was held on June 14 and 15. Many hams, members of the Radio Amateur Civil Emergency Service (RACES), cooperated with civil defense authorities in forming the backbone of communications for "Operation Alert."

During the Field Day weekend, individual members, groups of mem-

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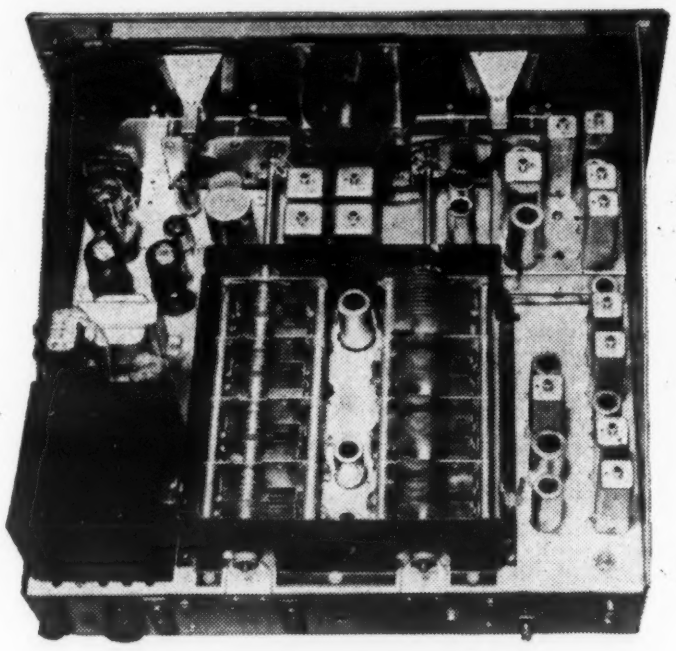
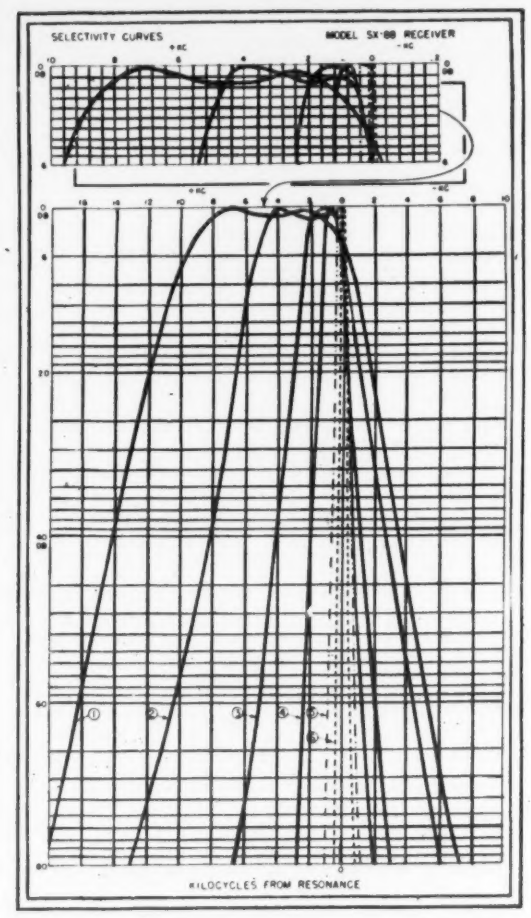
For the first time, selectivity from 10 kc to 250 cycles in six steps. Compare with ANY other receiver!





1. Heavy gauge steel welded chassis for mechanical stability.
2. Full precision gear drive for main and band spread tuning.
3. Six position Band Width Control (selectivity) from 250 cycles to 10 kc.
4. 10 watt inverse feed back and push-pull audio output.
5. Exhalted B.F.O. for tops in single side band reception.
6. Buffer amplifier in B.F.O. circuit.
7. Antenna trimmer.
8. Amplified and delayed A.V.C.
9. Built-in 100 kc calibration crystal.
10. Second conversion oscillators crystal controlled.
11. Inertia tuning (fly wheels both dials).
12. Full frequency coverage from 535 kc. to 33 mc.
13. Calibrated electrical band spread 160, 80, 40, 20, 15, 11, and 10 meters.
14. Logging scales on each tuning shaft.
15. Dial locks on each tuning shaft.
16. Tuning dial indicators resetable from front panel for maximum calibration accuracy.
17. Auxiliary A.C. socket on rear of chassis.
18. Illuminated band-in-use indicator.
19. Illuminated S meter.
20. Dual S meter calibration S units and microvolts.
21. Auxiliary power socket plus .6 amps at 6.3 volts and 10 ma at 150 volts for accessories.
22. Standard 8¾" by 19" panel for rack mounting if desired.
23. 50 kc i.f. output jack via cathode follower for teletype converter, etc.
24. Five position response control (tone control).
25. Two r.f. stages (Bands II to VI).
26. 17 tubes plus voltage regulator, ballast tube and rectifier.
27. Automatic noise limiter circuit.
28. Phono Jack.
29. Audio output transformer for 3.2, 8, 500/600 ohm loads.
30. Fuse for overload protection.
31. Auxiliary sensitivity control permits monitoring of local transmissions in standby position.

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bers, and affiliated clubs packed up low-powered transmitters, battery-operated receivers, gasoline-powered generators together with associated equipment, and set up radio operation in the open for the test.

The affair, which was conducted with groups of amateurs competing with other groups using the same general type of gear, was designed to prepare the hams to deal with real emergencies, such as floods, earthquakes, tornadoes and the like.

The scoring system encourages the use of emergency electrical power sources, such as batteries and gasoline generators, in cognizance of the fact that commercial electrical power is usually disrupted by any disaster which cuts the normal communications systems. Other scoring advantages are given to mobile and portable stations such as would be used in a search for a missing person or lost aircraft.

Mars Participates in Auto Show

As a part of the Easter Parade of Stars Auto Show, a MARS exhibit was installed in the Grand Ballroom of the Hotel Waldorf Astoria in New York City. During the show which ran from April 6 to April 11 messages were accepted for transmission to service personnel.

The show was sponsored by Auto-Lite and the proceeds of a special dinner and TV show held on April 6 were turned over to the Armed Forces Relief Societies. The $28,000 received was divided equally between the Army, Navy and Air Force relief agencies.

CONNECTICUT PRODUCES REVOLUTIONARY MOBILE RADIO

A revolutionary advance in radio circuit design—the patented Lister Circuit—has been incorporated in the new Connecticut "Fleetway" two-way radio, now being produced by the Connecticut Telephone & Electric Corp., Meriden, Conn., for operation in the recently allocated 450-460 and Citizens' band.

Among other major advantages, the new Connecticut "Fleetway" offers the first true FM transmission and reception in mobile radio. Resulting operating improvements are noise free, "broadcast quality" speech and better coverage in congested areas than ever before possible.

The "Fleetway" uses a starting crystal oscillating frequency of approximately 75 Mc instead of the usual 6 Mc. This enables the transmitter to reach 450 Mc with a frequency multiplication of only 6 instead of the usual 24 times or more. Elimination of these stages substantially reduces the number of components and leads to a complete departure from conventional radio design.

"Fleetway's" revolutionary Lister Circuit provides a clearer, better controlled signal out-put than ever before possible, a compact, lighter-weight unit, lower power requirements, and practically no frequency drift or spurious radiation to other equipment. The power unit drains less battery current than a car's headlights, eliminating the need for heavy duty generators and associated equipment.

SIXTEEN YEAR OLD GIRL JOINS MARS

On April 20, 1954, Miss Suzanne E. Curry, W4VTO, was granted membership in MARS-Army and was assigned the call A4VTO. She is the youngest "YL" operator in MARS, being just sixteen; she is 5 feet 6½ inches tall, weighs 117 pounds, has light brown hair and blue eyes.

Suzanne E. Curry, A4TVO, youngest girl to join MARS is shown at her station. The transmitter, a Viking II, was a gift on her 16th birthday from her father. The receiver is an S-76 and the Viking VFO was wired by Suzanne herself.

An honor stulent in the junior class in Waynesville Township High School (North Carolina), she became a senior on May 24. Suzanne was a Girl Scout for five years and presently belongs to the Tally-Ho Club, is an officer in the Order of the Rainbow for Girls and plays solo alto saxophone in the school Concert Band, which has shared top honors in North Carolina for four years. She was recently elected business manager for the school annual.

Suzanne and her mother (now WN4AGX) became interested in amateur radio in 1951 while visiting W4YPH. With the help of manuals and handbooks she learned the code and theory. At fourteen, Suzanne passed the Novice Examination on her first try. With the help of W4YPH she built a 5-watt transmitter and operated on CW running up a score of 300 contacts in two and one-half months. During this period her code speed increased to where she was able to obtain the ARRL Code Proficiency Certificate for 15 wpm. In April 1953 she passed the General Class Examination.

Suzanne is seriously considering attending the University of Florida to study electrical engineering. A4-VTO's present activities are mainly handling traffic on the MARS North Carolina Net.

Mars Activities at Northeastern University

Reports from Northeastern University in Boston indicate that MARS activities there are being given active support by the university.

First Lt. Frederick H. Griswold, MARS Custodian and MARS Station Director, is being assisted by Sergeant First Class Thomas E. Ralph, MARS Station Operator and Major Mark T. Muller, Senior Signal Corps Instructor, in a build-up program for MARS at the university.

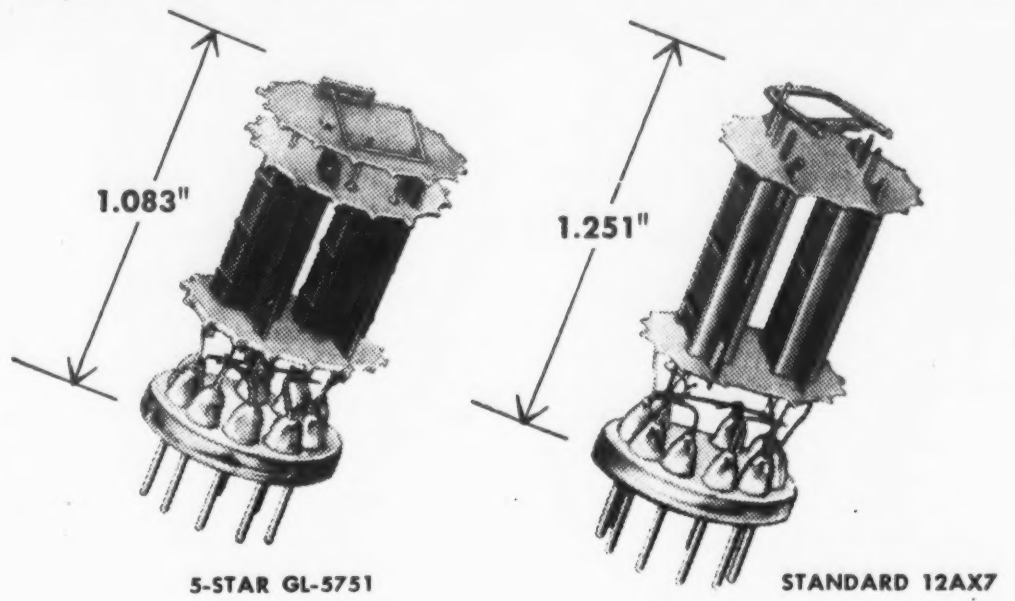
Several students are licensed radio amateurs, and many others are interested and participate occasionally. In April, three classes of 25 students each started in code instruction which continued over a nine-week period.

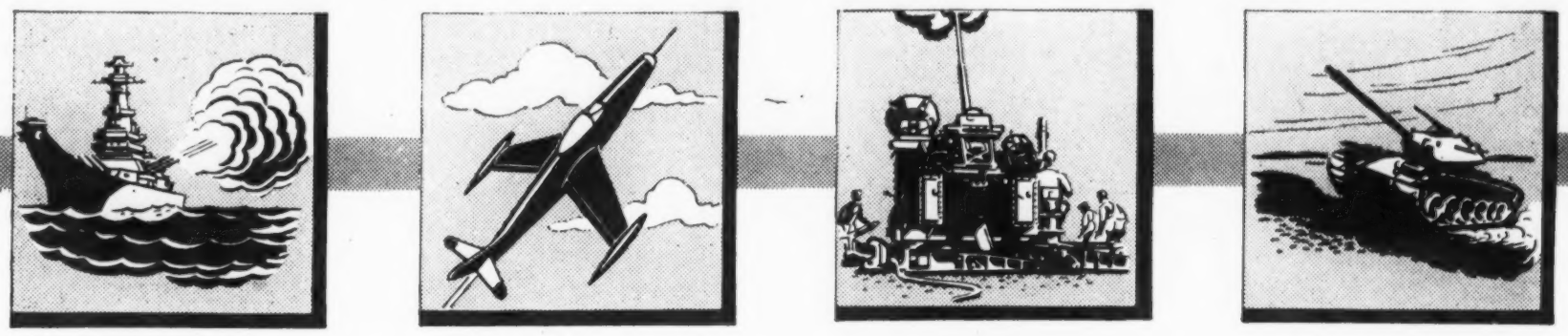
There has been a radio club on the campus for many years, but this is the first time that an effort has been made for cooperation between its members and MARS. Now that there is a practical merger of interests, many of the radio club members are MARS operators. In addition, certain surplus equipment obtained through MARS sources has been made available to the radio club.

In G-E 5-Star Tubes—

COMPACT, STURDY TUBE CAGES WITHSTAND SHOCKS AND VIBRATION!

Observe increased strength of the G-E 5-Star Tube structure (left) over standard prototype! With 13% less height, design is heavier, more substantial.





TUBES that will "take it"! You need them in military electronic equipment, land, sea, and air. G-E 5-Star Tubes are your safeguard against damaging jolts and jars, destructive vibration. 5-Star Tubes stand up because they're *designed for hard, long service.*

The cages—shorter, heavier—will resist stresses that often cause failures with standard tubes. Cathodes are larger in diameter, will not bow. See list at right for other 5-Star design features that contribute strength.

Ask for General Electric 5-Star Tubes . . . sturdy, tough, dependable . . . in new communications, radar, gun-control, other electronic equipment! Install 5-Star Tubes in present sockets as replacements! Interchange list will be sent you on request. Write *Tube Department, General Electric Company, Schenectady 5, N. Y.*

G-E 5-Star Tubes are the most reliable you can install! Among their many design features are:

Double mica spacers at both top and bottom brace the internal structure, and enlarge the surfaces in contact with the glass envelope. Result: still greater resistance to shocks and vibration.

★

Getter is double-staked to assure firm connection and support.

★

Heater bends are specially coated a second time, to assure uniform insulation and prevent "shorts".

★

A getter flash shield keeps conductive deposits off the mica spacers, in tubes where plate-grid leakage must be held to a minimum. Special slots in the spacers further decrease leakage.

★

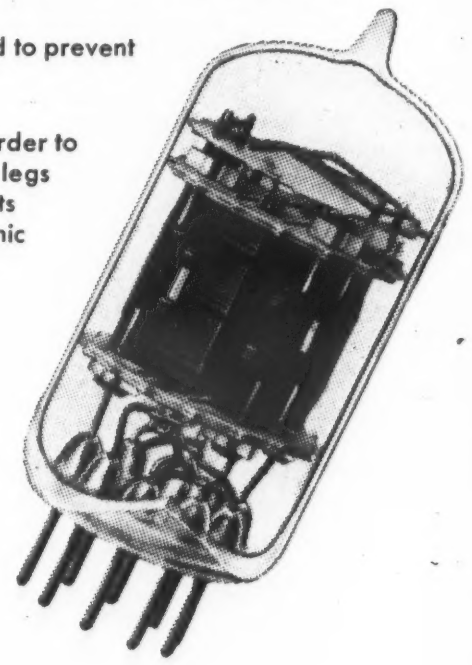
Critical grids are gold or silver-plated to prevent grid emission.

★

Grid legs are smooth (not nicked) in order to assure a continuing tight fit where the legs pass through the mica spacers. This cuts down on grid vibration and microphonic noise.

★ ★ ★ ★ ★

G-E 5-Star Tube, shown approx 1½ times actual size



GENERAL ELECTRIC

164-1A4

PHOTOGRAPHY

THE KENYON RAPROMATIC MODEL 3000 CAMERA

A new photographic instrument, the Rapromatic Model 3000, which was developed to photograph, process and project 35mm positive pictures seconds after exposed, has been announced by the Kenyon Instrument Co. Inc., of Huntington Station, New York.

With dimensions of 14 inches wide by 14 inches high by 22 inches deep, and weighing only 80 pounds, the Rapromatic is especially designed to photograph a cathode-ray screen, microscope field, strobe-lighted machinery, sporting events, etc. and to process and project the resultant pictures onto an 8 inch Fresnel type screen in the instrument or external screen of any desired size.

The instrument uses a standard prefocus base projection lamp up to 500 watts and 60 cycle AC consuming 1200 watts. It is equipped with a 40mm focal length f/1.6 recording lens and a 25mm focal length f/1.4 projection lens. The built-in processor is fabricated of 316 stainless steel and during processing, the nozzle of the unit makes a vacuum seal against emulsion surface and supplies the flowing solution at extremely high velocity.

Omega Introduces Condenser For Automega E-4 Enlarger

Simmon Brothers, Inc. recently announced the availability of the OMEGA D-2 Condenser Lamphouse for use on the Automega E-4 Enlarger. The new unit converts the E-4 into a high quality condenser autofocus enlarger for 2¼" by 2¼" to 4" by 5" negatives.

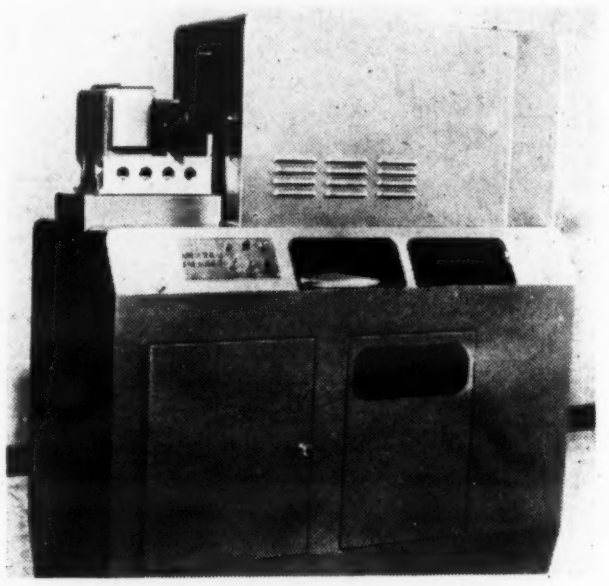
The Condenser Lamphouse interchanges easily with Omegalite to make a two-in-one enlarger of the E-4, a 5" by 7" enlarger with the Omegalite and a 4" by 5" enlarger with the Condenser Lamphouse.

The D-2 Condenser Lamphouse produces bright, sparkling prints, with slightly more contrast than those made with the Omegalite. It permits the same reliable, needle-sharp autofocusing operation as does the Omegalite. The condenser system uses interchangeable lenses and matching condensers for short, cool, evenly illuminated exposures and maximum magnifications. Designed to produce excellent results with all color processes, including Printon, it accommodates standard E-4 filmholders (4" by 5" and smaller). It conveniently rotates on the E-4 turntable as the Omegalite.

NEW DRY PROCESS MICROFILM ENLARGER

A compact microfilm enlarger which involves no chemicals or vapors at any step, and produces clear copies in 45 seconds has been developed by Arthur D. Little, Inc. of Cambridge, Mass. for Thomas J. Moran's Sons, Inc., graphic arts specialists of New Orleans, Louisiana.

The enlarger, developed as an outgrowth of previous Arthur D. Little research into a novel method of making printing, enlarges at a ratio of 14 to 1.



With the increasing commercial application of microfilming to live as well as dead files, it is expected that the enlarger will prove of immediate wide-spread use. An office copier based on the same process has also been developed. These two units, one to contact print, the other to transform the latent image into a clear permanent reproduction, are now in production.

FOUR-YEAR COURSE IN PHOTOGRAPHY TO BE OFFERED

A four-year program in photography, leading to a Bachelor of Fine Arts degree or to a diploma—depending upon the course schedule chosen by the student—will be introduced next September at the Philadelphia Museum School of Art, Dean E. M. Benson announced recently.

One of the first programs of its kind to be offered by an American art school, this new curriculum will combine classes in photography, art and the humanities.

Training in photography will begin with a general introduction to the use of the camera and the darkroom. From there the student will move to more specialized work in one or a few fields of major interest. These may include advertising photography, editorial photography, industrial photography or any one of a great many other fields.

The course structure of the Photography Department will be built on the assumption that the camera artist is closely related to the artist who works at a drawing board or an easel. Like the designers, illustrators and advertising artists also trained at the Philadelphia Museum School, photography students will spend a fair amount of time in the drawing and painting studios.

Heading the newly organized department will be Sol Mednick, who now directs the Museum School's photograph classes as part of the programs of other departments.

Courses will be conducted in the Museum School's new studio-laboratory. Among the few photographic laboratories in the world planned specifically for teaching purposes, the new studio-lab is completely equipped to accommodate 50 students and their instructors at one time.

Society of Photographic Engineers Holds Fourth Annual Conference

Several hundred members of the Society of Photographic Engineers gathered at West Point, New York on May 26, 27 and 28 for their fourth annual conference.

Among the 40 papers presented at the conference several are of interest. *A. 0.1 Microsecond Kerr-Cell Shutter*, by M. Sultanoff of the Aberdeen Proving Ground described a Kerr-Cell shutter developed for use in the study of explosions.

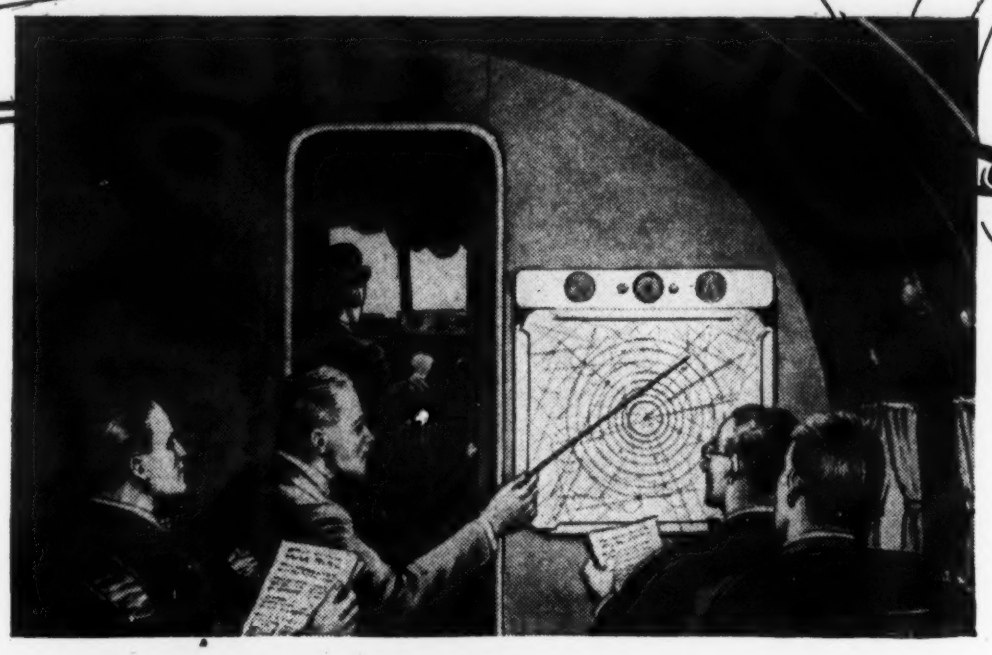
A. Bayle, of Vectron, Inc., presented *Type E-2 Aerial Panoramic Camera*, which described the Vectron medium focal length, gyro-stabilized aerial panoramic camera which yields horizon-to-horizon photographs.

An Automatic Color Filter Changer, by L. W. Glennon, of the U. S. Army

(*Continued on page 76*)

THIS FLYING LABORATORY CARRIES A UNIQUE CARGO

. . . many of tomorrow's navigation and communications devices now being designed by IT&T for aircraft safety and efficiency.



The interior of the "Flying Laboratory" of Federal Telecommunication Laboratories, a division of IT&T, is a veritable airborne workshop. Here, navigation aids for use at short and very long distances as well as for low approach and landing, and many other experimental radio and electronic devices are put through their paces under "in-service" conditions.

Perhaps most widely-known at this time of all aircraft navigation aids pioneered by IT&T scientists is ILS (Instrument Low Approach System). Radio beams of ground transmitters activate two needle pointers on the plane's indicator. When both are perfectly centered, the pilot knows he is directly in the center of the approach lane, and at the right angle of descent for a perfect landing.

Since the early days of flight, IT&T research has made many contributions to safer, more dependable flying. It began with the world's first instantaneous direction finder. It continued through ILS, air-to-ground radio, VHF airport direction finders, and greatly improved VHF omnidirectional radio range (VOR). Today, Navarho, Navascreen, two-color radar and Moving Target Indicator Radar promise great benefits for aircraft traffic control. And very important is IT&T's newest crystal-controlled distance measuring equipment (DME) which, in combination with VOR, tells the pilot with uncanny accuracy his distance and direction to or from a known ground station.

Years of experience in research, and high skill in production are important reasons why better performance is built into products for home, business and industry by the manufacturing divisions of IT&T—a great American trademark.

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IT&T

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
67 Broad Street, New York 4, N. Y.

PHOTOGRAPHY

Signal Corps Pictorial Center, Long Island City, N. Y. discussed a method for obtaining automatic scene-to-scene color corrections in motion picture printing with printers not specially adapted for this type of work.

An electrical heating unit for motion picture cameras shaped to fit into cavities within the camera was described in *A Heating Unit for Motion Picture Cameras, Operating in Sub-Zero Temperatures,* by J. J. Lipkowitz and E. Baumert, U. S. Army Signal Corps Pictorial Center.

Electronic Flashtube Characteristics, by H. E. Edgerton and J. T. Lamb, of the Massachusetts Institute of Technology presented the electrical and light producing properties of electronic flashtubes in forms helpful to designers of equipment using such lamps.

Among the many exhibits which should be noted was that of the Rush Instrument Co. with its comparatively new Rush Synchro Shutter Tester and a brand new device for testing and calibrating photo-electric exposure meters.

The Bell & Howell Co. displayed its newly developed Xenon light source as applied to the B & H Shutterless 16mm JAN projector.

The Charles A. Hulcher Co., Inc. exhibited its special 70mm large rapid sequence camera used in research and development work in the missile field.

The Society of Photographic Engineers was founded in 1947, and since then has expanded into a society of national scope consisting of seven chapters and some 700 members.

Electric Device Makes Good Pictures From Bad Ones

A new electro-optical system that clarifies blurred photographs and produces line drawings from half tone photographs has been announced by the National Bureau of Standards, in Washington, D. C.

The device, which also promises to have a number of useful engineering applications, was developed by H. M. Joseph of the Bureau's electronic instrumentation laboratory in consultation with Dr. L. S. G. Kovasznay, Johns Hopkins University, who suggested the basic design and has continued to act as consultant on the project. In operation, a fuzzy photographic transparency is placed in an optical assembly between a cathode-ray tube with a moving spot and a photo multiplier tube. The resultant signals from scanning the picture are amplified and fed back to the intensity control of the cathode-ray and a picture is produced on its screen.

Thus the picture is sharpened up, making lines, sharp light and shadow areas out of what the eye could see only as fuzzy undefined areas. Then a photograph of the sharpened image as it appears on the face of the cathode-ray tube is taken and processed in the usual manner. Thus, a good picture has been made from one that otherwise would not be useable. The process is useful in the automatic production of sketch maps from terrain photographs or for the comparison of photographs of military targets, finger-prints, printed or written matter etc. The project was conducted as part of NBS basic instrumentation program which is sponsored by the Office of Naval Research, the Office of Air Research, and The Atomic Energy Commission.

In a race between the oldest and newest in communications Morse's 1844 instrument lost by an amazing margin to Western Union's new Intrafax. Enacting the role of Morse is George Finch and the girl operating the Intrafax is Joan Ott.

MORSE KEY RACES INTRAFAX

Commemorating the 110th anniversary of the sending of the first telegram, the Western Union Telegraph Company staged a special communications race between the oldest and newest telegraph machines at its New York headquarters.

The race matched a replica of Morse's crude instrument against Western Union's new letter-size facsimile, Intrafax.

The Morse operator was given a copy of the first telegram. At the same time the Intrafax operator was handed the whole 1500-word page of the Holy Bible from which the "What Hath God Wrought!" quotation was taken.

The Morse operator transmitted his message in 25 seconds at a speed of 8 words a minute. The message arrived in the form of dots and dashes on a paper tube and then had to be decoded.

The Intrafax operator merely pushed a button. Immediately the Bible page began whirling in front of an electric eye, and a facsimile picture of the entire page was reproduced by the distant recorder in three minutes. This is 500 words a minute.

Intrafax sends and reproduces a standard 8½ by 11 inch form or letter in less than three minutes. One model handles extra-large, legal-size letters or forms 8½ by 14 inches in size.

The new facsimile system also will handle material that cannot be transmitted by any other medium, such as diagrams, drawings, maps, blueprints and complicated tabulations. A document can be sent to a single point, or to several points simultaneously.

Dr. Washer Appointed Chief of Optical Instruments Section at NBS

Dr. Francis E. Washer, well known in the field of optics, has been appointed Chief of the Optical Instruments Section of the National Bureau of Standards.

Dr. Washer, a staff member of NBS since 1935, is a member of the Washington Academy of Sciences, the American Association for the Advancement of Science and the Society of Photographic Engineers.

He is a Director of the American Society of Photogrammetry and brings to his new position a wealth of knowledge and experience in the field of optics.

Moving?

Let us know too so that you won't miss any issues of SIGNAL or the Newsletter.

Catching Up with Government Specifications

(*Continued from page* 31)

outcome of the tests if the resubmission is made within the time specified by the activity responsible for qualification.

Lists of qualified products are for the convenience of the Federal Government and its contractors and sub-contractors in the performance of procurement functions. For that reason, the reproduction of lists or any reference to lists, letters, results of tests, or other information relating to qualification shall not be circulated, referred to, or otherwise used for publicity or advertising purposes, or for sales other than those leading to ultimate use of the product by an agency of the Government. Manufacturers are informed of this policy and notified that the approval is subject to cancellation in violation of this regulation.

Each list carries a notice that it may be made available to prospective bidders or suppliers who require it in furnishing supplies or service to the Government. It is the responsibility of Government Inspection offices to determine when the information contained in the qualified products lists is required by either prime contractors or subcontractors, and to issue the required information. Copies of the lists are not furnished to manufacturers since the notification of approval to the manufacturer when his product is approved contains information necessary for his use in the preparation of bids.

Nationally recognized industry and technical society standards and specifications are used to the greatest extent possible in the development of Military and Federal specifications (treated at length in Part I of this series—Ed.) standards and qualified products lists. By working together in this way, the Government departments and Industry can insure the success of their procurement programs to such a degree that maximum benefits are obtained by all.

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A Challenge for Defense

(*Continued from page* 16)

So, there is an answer to all this. This does not mean the end of the world unless that's what we want it to mean. If the Russians bomb the 92 critical target areas of the United States, they attack 67 million people, but they attack only about three percent of the real estate of America. If we have the guts to get off the floor the next morning and if we are interested enough in preserving our freedom of religion, our democratic system of government and our system of free enterprise, if we think those things are worthwhile and are willing to fight for them, and if we are willing to start planning now for the Atomic Age from which we can never escape, then, in my judgment, we can figure out the ways to absorb this kind of attack and continue to live, tough as it is going to be.

And bear this in mind—I throw it out because there are military people in the room and I think it is time that the military think about this; I have discussed it at several places, the Industrial War College, the Air University, and some other places I had better not mention here—the Army is not going anywhere the morning after this attack. I hope the Air Force is still flying, and I hope the Navy is still moving on the water; but you are not going to move land armies anywhere the next morning. Why not? Because if the enemy successfully attacks 67 to 100 American cities, there won't be any harbors to ship troops from and there won't be any ships left afloat in those harbors. There won't be any railroad terminals in America. And you aren't going to start shipping soldiers around the world when America is binding up its wounds and its industrial guts are spread out on the ground. No, you have a different deal than you had in World War II, and you can't think in terms of World War II.

Now, it is going to take sheer guts for Mr. and Mrs. America to get off that ground and start living in a primitive way until we can reconstruct the industry of America, and the more rapidly we can do it, the better chance we will have of defeating the Russians and maintaining an opportunity for men to live in freedom in this world. It is a grim picture, but it is not an impossible picture. Thank you a lot.

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Facsimile Equipment Development in the Signal Corps

(*Continued from page* 34)

two-thirds of that available. The commercial practice of individually engineering and equalizing each circuit that is to be used for facsimile transmissions cannot be tolerated in the military communication system, where maximum flexibility and economy of circuits is of paramount importance. Neither is it economically sound, from a military point of view, to engineer all circuits to the high standards required for maximum facsimile transmission speeds when only a small percentage of the circuits will be employed for facsimile transmissions at any given time. It appeared, therefore, that there was a definite requirement to develop techniques for quickly measuring and equalizing the delay distortion existing in military circuits to be used for facsimile transmissions or for data or allied intelligence transmissions, where accuracy in reproduction of the transmitted signal is a critical requirement. Accordingly, Western Union Telegraph Company is currently engaged in a research investigation for the Laboratories for the purpose of devising methods by which the phase or time-delay distortion in a communication circuit of any type may be easily and quickly measured *and* corrected by "the man in the field." The end result of the study will be the fabrication of experimental models of applique-type equipment to be installed at the terminals of the circuit and which will demonstrate the validity of the research findings of the study.

The Laboratories have engaged in various external and internal research activities including: the application of Xerography to facsimile recording; development of new daylight recording papers, including a new stencil master permitting multiple copies; ink and molten metal methods of recording; a low voltage tape transceiver; a stable audio oscillator; a high definition facsimile equipment; a forward echelon experimental type portable facsimile transmitter with rear echelon facsimile receiver plus others still in the planning stages.

The Laboratories have conceived and developed various accessories for facsimile equipments which have been accepted by the using arms. Included are: Modulation Indicator ID-176 which permits simple and easy determination of the percentage of modulation applied to a radio transmitter; facsimile Converter CV-2/TX which converts SCAM to SCFM and vice versa for radio facsimile transmissions; a light-proof tent to permit photographic reception employing Facsimile Equipment RC-120 without a darkroom; a daylight photographic developing tank, and many other efficient and economic devices all designed to improve the facsimile method of communication.

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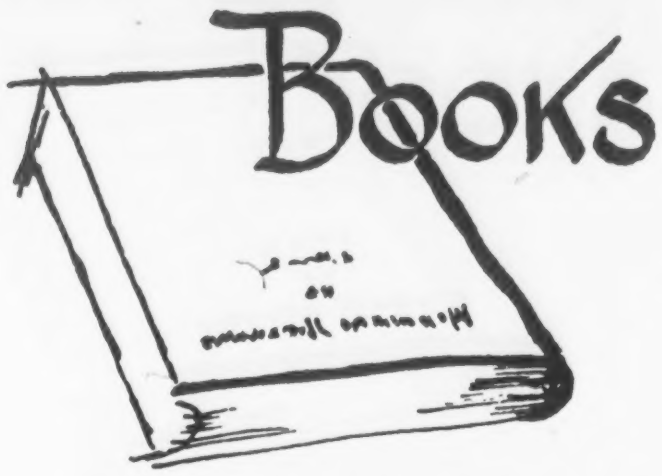


ELECTRONICS. By George F. Corcoran and Henry W. Price. John Wiley & Sons, Inc., New York, N. Y. 459 pages, $7.00.

This guide to an understanding of electronics strikes a logical balance between electron-tube and transistor physics on the one hand, and associated circuitry on the other.

Although emphasis has been placed on the circuitry aspect of the subject, the authors have included a comprehensive and easily grasped treatment of the basic principles of electronics.

After a brief introduction and a discussion of mobile charges, the book proceeds from the elementary principles of vacuum-diode operation to an up-to-date discussion of feedback circuits, transistors, and oscillators.

The concept of return voltage ratio is included as an aid to understanding feedback amplifier theory, oscillator operation, and stability of electrical systems.

A comprehensive chapter is devoted to graphical methods. Almost all of the articles in this book are concluded with one or more examples which illustrate quantitatively the subject matter under discussion.

APPLIED ATOMIC ENERGY. By K. Fearnside, E. W. Jones and E. N. Shaw. Philosophical Library, New York, N. Y. 156 pages, $4.75

The application of atomic energy to peaceful purposes, in the shape of radioactive isotopes, has been introduced only in the last few years, but already a number of problems have been satisfactorily solved by the new techniques thus made available.

This book provides a background knowledge of nuclear physics necessary to an understanding of the advantages to be derived from these techniques and discusses a large number of applications to different fields of pure and applied science, including radiography techniques and the use of isotopes in pure research, biological work, industry and medicine.

THE TECHNIQUE OF DEFINITION. 10th Edition. By Arthur Cox. The Focal Press, London and New York. 377 pages, 17 Shillings, 6 Pence net.

Cox's excellent book on optics and lenses for photography was first published in 1943 and has now reached its 10th edition.

The book is devoted entirely to the most vital part of any camera—the lens—which is treated exhaustively and thoroughly in language that is easily understood by the average photographer without becoming too involved in scientific terms and formulae.

Although the study of optics is a highly technical one, Cox's treatment may well be said to have successfully bridged the gap between the highly scientific approach of the designer and the man who uses the lens.

The book is not only suitable for photographers, but any one who is interested in photographic optics can derive a great deal of benefit from the use of it.

Well written and illustrated, *The Technique of Definition* contains chapters on the defects of lenses in their many forms and is recommended to all who are interested in this subject, so vital to the photographer and technician alike.

TRANSISTORS — THEORY AND PRACTICE By Rufus P. Turner. Gernsback Publications, Inc., New York, N. Y. 144 pages, $2.00.

The purpose of this book is to provide an elementary explanation of transistor theory and operation for the thousands of practical electronic workers.

A comparatively enormous quantity of periodical literature has appeared during the transistor's first five years. Unfortunately, however, much of the explanatory material has been so involved mathematically as to be useless to the practical man.

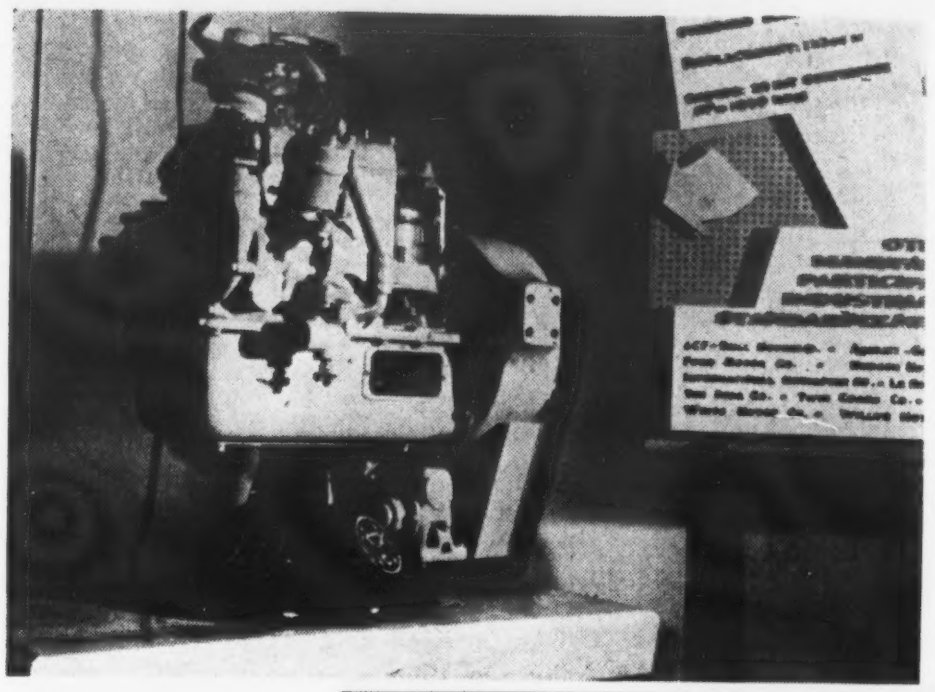
In this book, the author, long an authority on semiconductor devices, tells in simple language how transistors work and what their circuits are like.

A tremendous amount of work is constantly being carried on in transistor electronics. Undoubtedly, this will result in many new theories, reworked older ones, further transistor types, and new circuits. In the meantime, this text is offered as a guide to many practical electronic workers entering the field of the transistor.

Signal Corps Birthday Celebration

At Headquarters, I Corps in Korea. Pfc. John T. Deamiston, Sommerville, Tenn., switchboard operator for the 51st Signal Battalion's communications center, looks over the miniature switchboard built on top of the group's birthday cake. Lt. Gen. Blackshear M. Bryan, Corps commander, participated in the cake cutting ceremonies at the center.

Fort Monmouth combined the celebration of its 37th birthday and the 94th birthday of the Signal Corps on June 21st. Marching as the Color Guard in the review of some 6,000 troops, the colors were borne by Ft. Monmouth soldiers dressed in (right to left) Civil War, Spanish American War, World War I and present day outfits to illustrate the history of the Corps.



Recently on display at the Pentagon Building in Washington in connection with an exhibit by the Department of Defense was the Hercules IXBER gasoline engine. As shown here, the engine is sectionalized so that internal working parts are visible.

Hercules Motors Exhibits Engine

A recent exhibit in the main lobby of the Pentagon featured the Hercules IXBER gasoline engine.

The exhibit explained the standardization program of high mortality parts in gasoline engines used by the Department of Defense.

Hercules Motor Corporation is cooperating in this standardization program which is under the direction of the office of Assistant Secretary of Defense for Supply and Logistics and under the Corps of Engineers Research and Development Laboratories at Fort Belvoir, Virginia.

USAF Programming for Fixed Communications-Electronics Facilities

(*Continued from page* 24)

of the new AF communications programming procedure that makes it such an improvement over the earlier methods. Previously, each communicator had to accomplish or supervise many of the actions now handled by the engineering agency. In many cases, the efforts of the communicator to engineer and site a facility, and to prepare a complete bill of materials for the facility fell short of the desired standard because of his limited knowledge of installation, engineering and supply procedures. With the engineering and supply agencies now performing this work, the Air Force communicator has turned his efforts to planning, operating and supporting his C-E facilities. In short, the Air Force communicator has turned his endeavors toward management. When consideration is given to the initial cost, plus the annual maintenance and operating costs, of the communications facilities under his supervision, it can truly be said that the Air Force communicator is a "Big-business Manager."

In becoming a manager the Air Force communicator is getting away from the former classical "dit-dah-dit" communicator. He must now be familiar with:

a. Air Force supply procedures;

b. requirements and procedures for budgeting and financial planning for C-E facility support;

c. procedures associated with the Public Works construction program;

d. personnel and training programs; and,

e. Air Force maintenance procedures.

All of these are important, but the latter item is of particular significance, since the operational efficiency of any C-E facility is only as good as the maintenance that goes into the facility. If installed facilities are not properly maintained, much of the previous effort in programming, budgeting, procuring and installing has been wasted. Likewise, the Air Force funds that provided the facility have been wasted.

In summary, the success of the Air Force communications program is the responsibility of the Air Force Communicator, a responsibility that can be readily assumed when he understands:

a. *What* programming is;

b. *Why* programming is required;

c. *How* to program for required facilities;

d. *When* to program to assure having facilities when they are needed;

e. *Where* to obtain program information; and,

f. *Who* provides program support.

With the adoption of this new procedure, based on sound business management principles and methods, the Air Force has given the communicator the tools with which he can more readily assume his responsibilities to the Air Force and to the American taxpayer.

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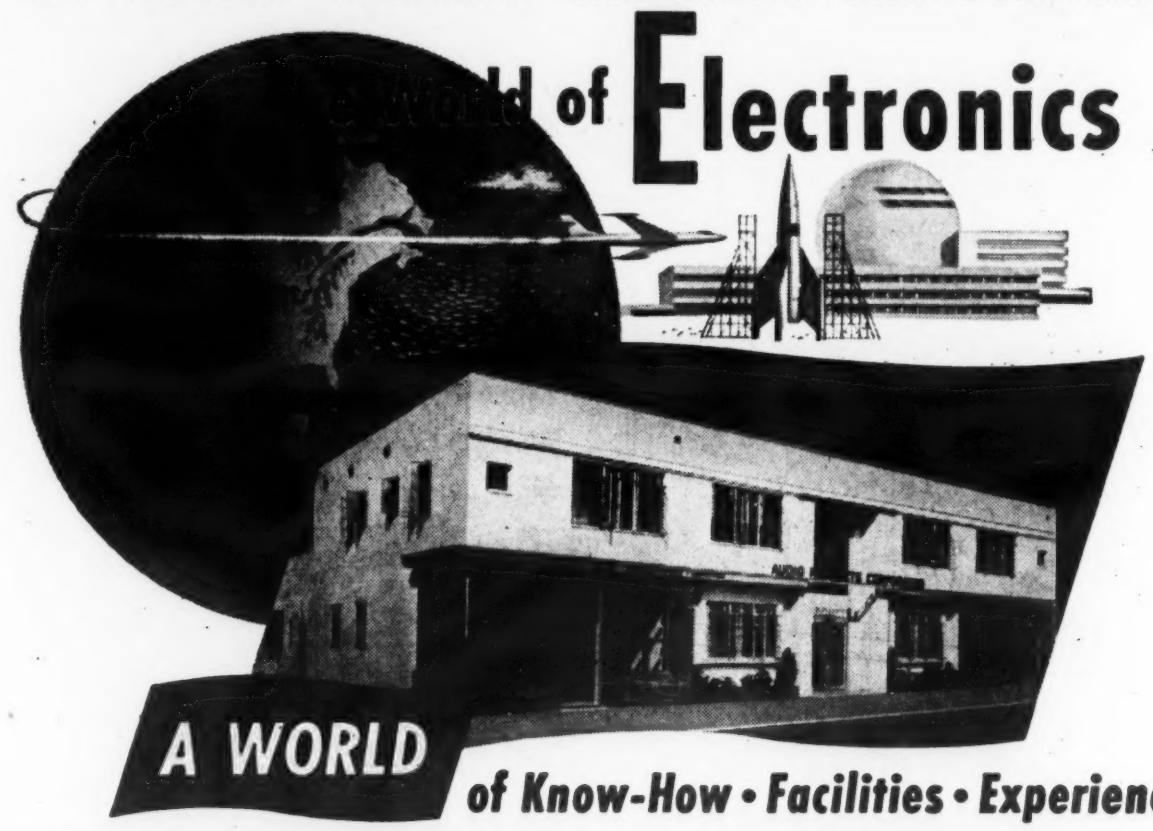

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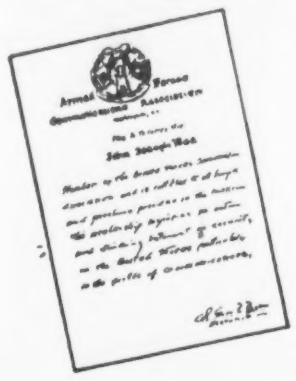

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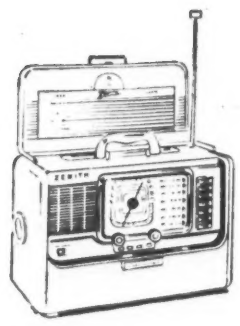
Where in the world was the radio the Army wanted?



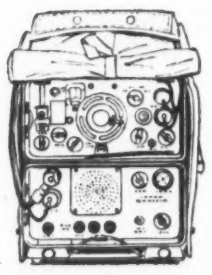
The year was 1952. The army wanted a radio that would build morale. One that would let servicemen hear home, wherever in the world they were sent.

Such a set would have to work under extreme hazards of arctic cold, tropic humidity, uncertain power supply . . .

Where did the Army find it?

Here at Zenith. It was the famous Zenith TRANS-OCEANIC shortwave portable, already a veteran of 11 years of rugged service all over the world. It had been tested and proven under countless "impossible" conditions. No other radio could touch its performance record. The Army asked Zenith to make a few adaptations in this famous radio, and it was ready as the R-520/URR for government service.

Being ahead of the times in radionics is Zenith's specialty. We are proud that our experience in bringing better things to the American people can serve the Government.



Zenith's experience in shortwave makes them a logical producer of the Army's AN/GRR5. This powerful shortwave radio is used by the Army for receiving messages in the field under very gruelling conditions. It is another example of the benefit of Zenith's 35 years of "know-how" brought to Government service.

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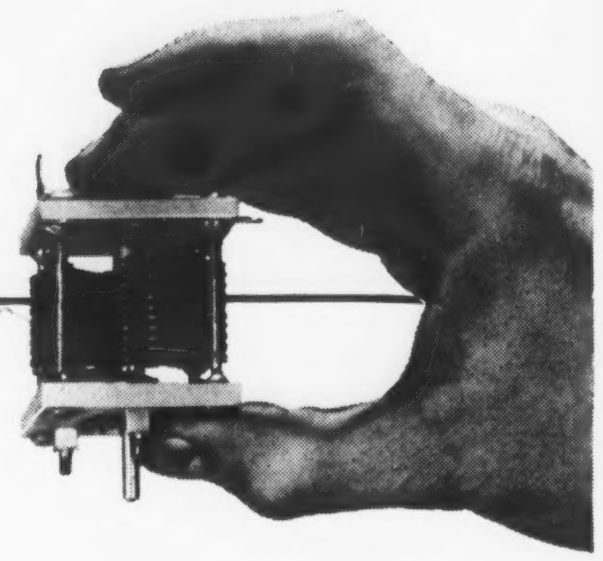

Lewyt-manufactured
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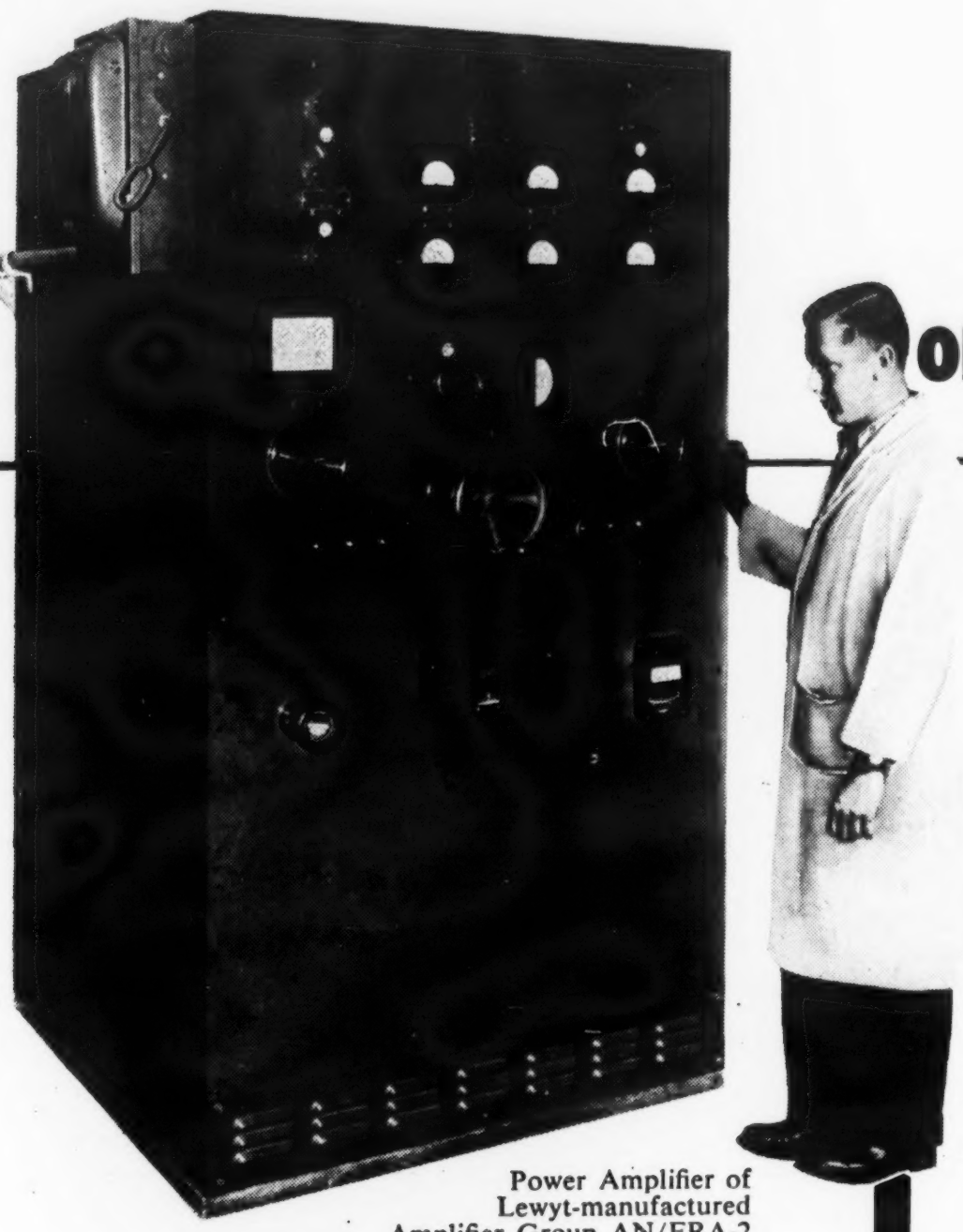

Power Amplifier of
Lewyt-manufactured
Amplifier Group AN/FRA-2

Lewyt has been making electronic equipment of all types and sizes for Government since 1914 . . . from small field sets to big fixed-station equipment like the AN/FRA-2 Amplifier Group, part of which is shown above.

Lewyt even manufactures up to 65% of the components to go into this equipment, such as variable capacitors, transformers, chokes, chassis, precision machined parts.

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And, since Lewyt is also one of America's largest vacuum cleaner manufacturers, it maintains a workforce of 1800 at all times which could switch to total defense production tomorrow . . . and if necessary double, triple or quadruple that production.

there's no limit to LEWYT manufacturing flexibility!

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